BEHIND THE SCENES
WITH A FISHING FLEET

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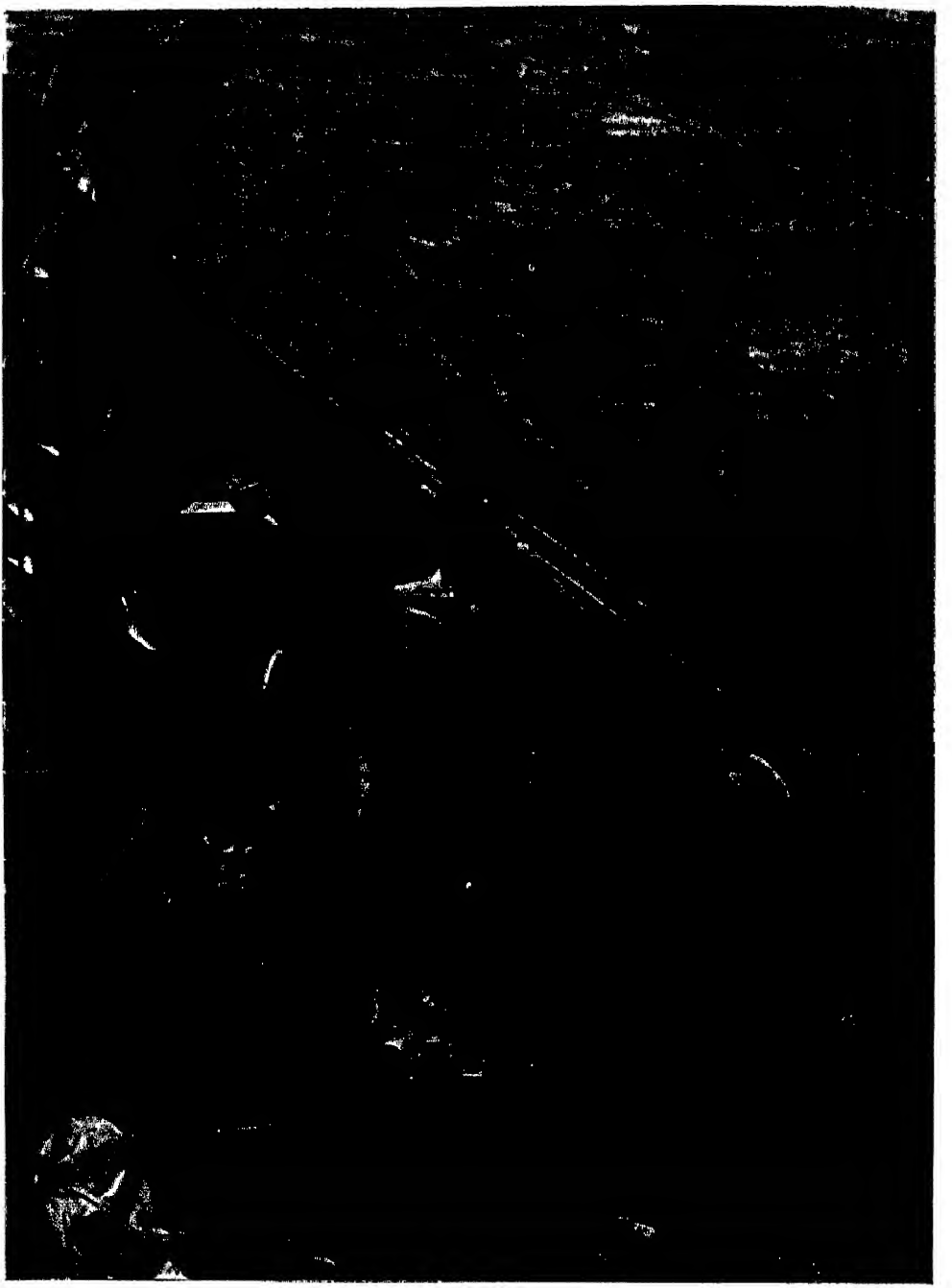

Night and day the trawler's nets are heaved on board weighed down with their silver harvest, and the trawler settles deeper in the water with its load

BEHIND THE SCENES

with a Fishing Fleet

MARC ALEXANDER

WITH 34 PHOTOGRAPHS,
A COLOURED FRONTISPIECE
AND LINE DRAWINGS BY
LASZLO ACS

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By courtesy of 'Fishing News'

A grab which brings up samples of sea-bottom creatures
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By courtesy of the Royal National Lifeboat Institution

The latest type of lifeboat, which is self-righting in the worst storm
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A porter at Billingsgate
Photo: Marc Alexander

Early morning at Billingsgate
Photo: Marc Alexander

DRAWINGS

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CHAPTER

1

A Fishing Boat Sails

THE quayside is lined with fishing boats, their lights casting eerie reflections on the dark water. It is the early hours of a crisp autumn morning, and there is a salty tang in the air. The tide is just right to put to sea, and one of the fishing boats is preparing to sail.

The skipper is at his place in the wheelhouse, and the rest of the crew are beginning to report for duty. Sleepily swinging their bags, they walk along the quay one by one and clamber aboard. They call out a few cheery words to the skipper, who is leaning out of a window to watch their arrival, and then make their way aft to the crew's quarters to stow their baggage and put on their oilskins.

Six narrow bunks are ranged round the walls, and in the centre of the cabin there is a table where the men eat, read, or play cards. The space is very restricted, but the men make themselves surprisingly comfortable in their quarters. The skipper and his mate, who are on christian name terms, have separate cabins, but these are little better than cupboards.

The crew's quarters are opposite the galley where the meals are cooked. The cook brings in some welcome cups of tea to warm the men up before they go on deck. As they sip their tea

the mate appears with a nervous-looking boy who has just left school and is to make his first voyage as a deckboy. 'Well, lads, we've got a new deckie,' says the mate. He introduces the boy to the crew, winks at the others as if to say 'Look after him, lads,' and then departs to join the skipper in the wheelhouse.

The engines are now started up. The engineer listens with a critical ear to the sound of the diesels, and studies the dials and gauges. A trawler may not be a glamorous craft, but her engine-room is as smart as that of a luxury ocean liner: the walls are a spotless white, and the copper tubing glows like gold in the harsh electric light.

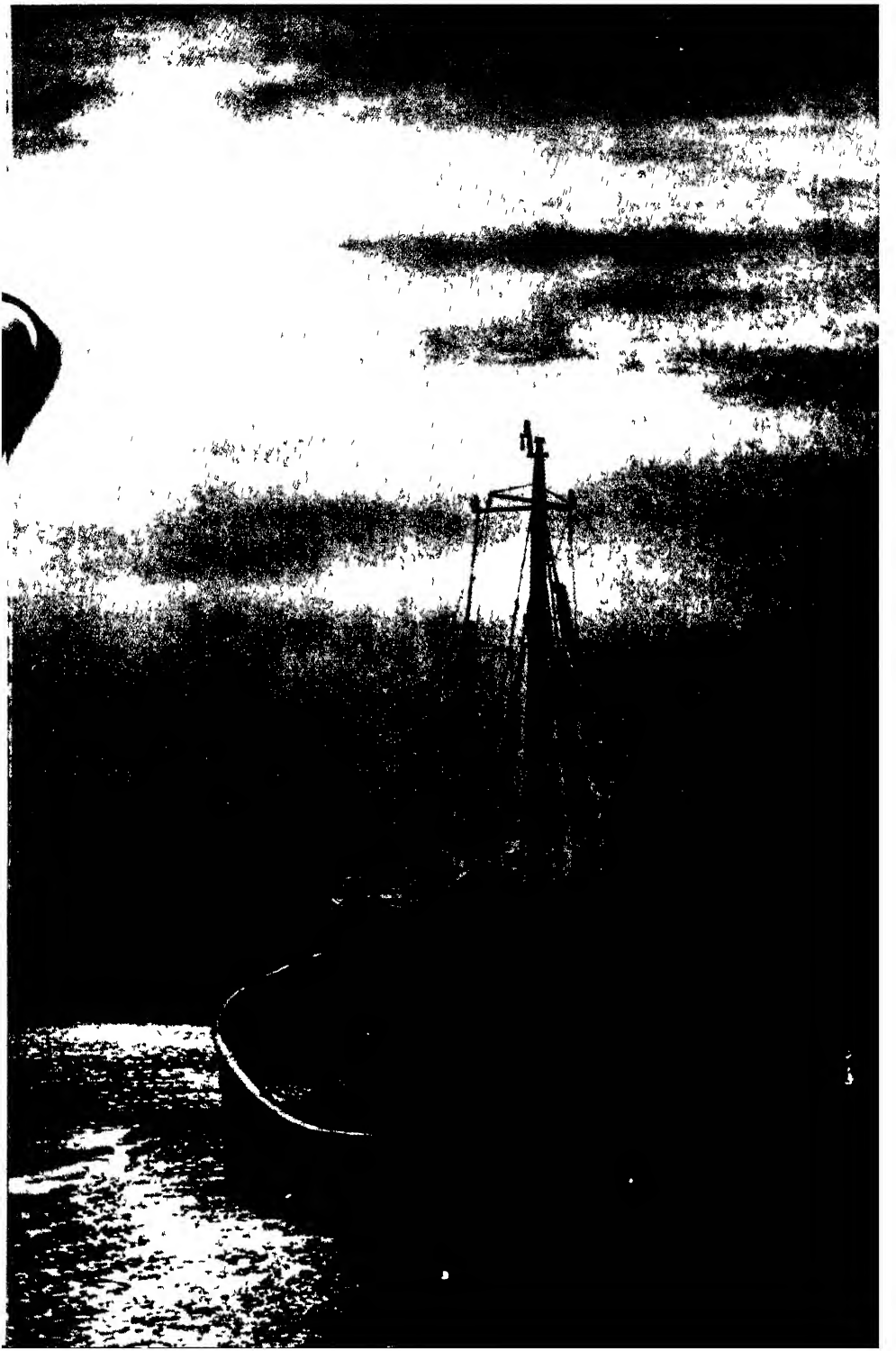
The mate calls out from the deck: 'Right-o, lads, we'd better be off. The fish won't wait!' Two deckhands release the moorings, and in the wheelhouse the skipper signals 'Slow Ahead' on the engine-room telegraph. And so, without ceremony, the fishing boat puts to sea.

As the boat slowly begins to move forward, the skipper spins the wheel, glancing at the battery of equipment around him. To his right is the radio direction-indicator apparatus; to his left an echometer which he hopes will locate some fine shoals for him; while behind him is the radio-telephone equipment. In the ceiling above the wheel is mounted the compass, and hanging beside it is a silver horseshoe—the skipper's good-luck charm which he took from his wedding cake.

The skipper is in his middle twenties—a young age for such responsibility. But in the fishing industry young men who can pass their examinations and who have a flair for detecting fish have good opportunities to rise to the top. A young skipper who regularly brings back full holds, and who is also a skilful seaman, commands the respect and confidence of his crew, and this makes a 'happy ship'. A good catch means good money for everyone.

The crew's quarters on a modern fishing boat are made as comfortable as possible in a small space

With school only just behind him, the new deckhand arrives to join his first ship



◁ *A Lowestoft drifter puts to sea Drifters usually operate within fifty miles of the coast, yet are often longer away from home than distant water trawlers*

Above *The trawl net, 160 feet or more in length, being shot from the deck of a modern trawler*

Slowly the huge net, with its thousands of fish, is hauled in hand over hand.

The long night's trawling has brought a rich harvest, and dawn sees the last nets being taken aboard

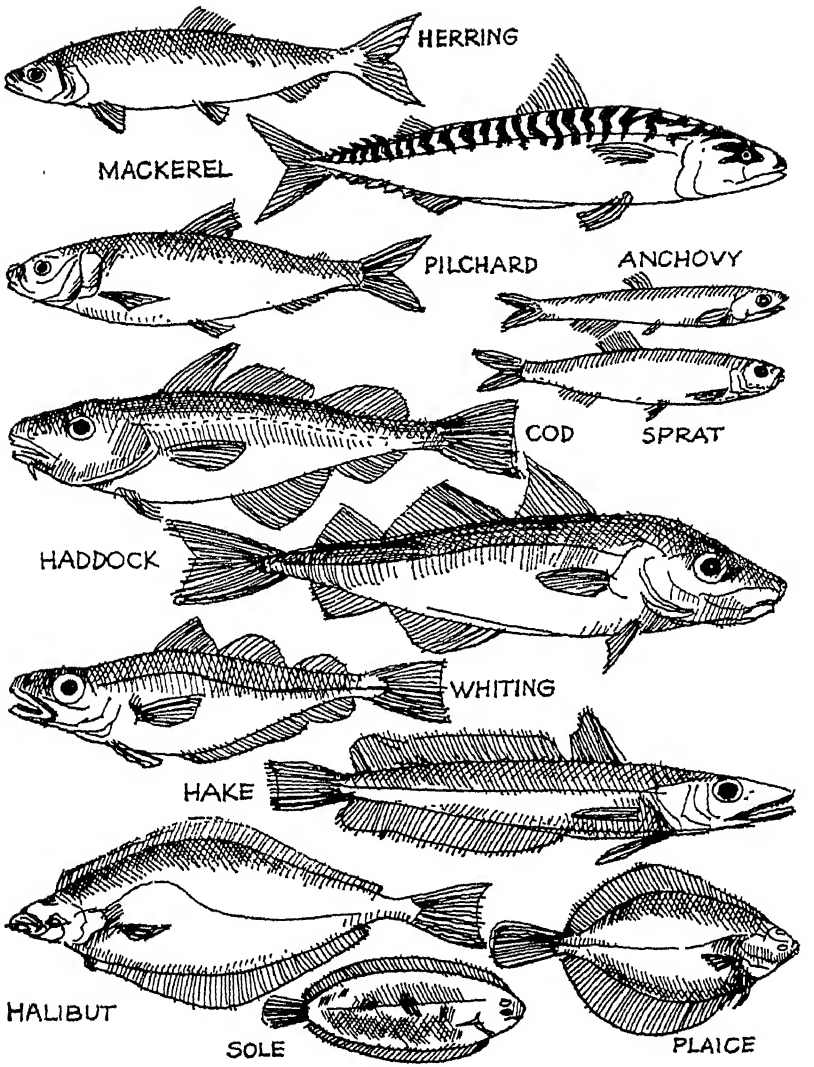
Left· *A moment of triumph for the crew, after many hours' gruelling work*

Right *The fish must be gutted and packed in ice at great speed, so as to get the decks clear for the next haul*

Left: *A freshly caught cod is put on ice in the hold of a trawler.*

Another job that has to be carried out very speedily between trawls is repairing damaged nets.

In the Arctic fishing-grounds the crew may have to chop ice from equipment before fishing begins



The principal kinds of edible fish caught by British fishing fleets

The skipper gives a quick glance at his horseshoe and determines to make a record catch this trip. The trawler slips past the other vessels lining the quay, their masts and rigging looking ghostly in the early half-light. Several of these trawlers are now also preparing to leave for the fishing grounds. Beyond the harbour entrance the boat begins to rise and fall as it meets the swell of the open sea.

The new deckhand feels this movement with apprehension, fearing that he may disgrace himself on his first voyage by being sick. He leans over the side and watches a little wistfully the navigation lights of the harbour dwindling away, while a crisp breeze blows in his face. But the crew begin to chat and laugh with a new freedom: they are at sea again.

As the light gains in brightness, some of the men begin to work on deck checking the gear and bending over the long rolls of net lying by the bulwarks.

From the wheelhouse comes the crackle of the radio as the skipper switches on to listen to the latest weather reports. One of the older fishermen gives a disapproving snort and remarks to the new 'deckie': 'We didn't have that when I was a lad. Things have changed a lot in my time. There was no radio when I first went to sea.' Music relayed by the B.B.C. then echoes through the loudspeakers. 'In my young days,' the old salt scoffs, 'we used to sing as we worked—not listen to this stuff!'

'I'd rather hear this than listen to your voice!' the cook chaffs him as he takes a cup of tea up to the skipper in the wheelhouse. The crew of a fishing boat chaff one another about anything and everything.

'How does it look, skipper?' the cook asks as he temporarily takes over the wheel to allow the skipper to drink his tea.

'The weather seems pretty good up north,' he replies. 'I just heard a couple of skippers chatting on the R/T, and it seems that there's plenty of fish about up there.'

As the boat rolls and pitches on her journey to the fishing ground, the crew have little to do after the equipment has been checked. So those not on navigational duty sit in their cabin chatting or playing cards. But there is no idling for the deck-boy, who is kept busy peeling potatoes, helping the cook generally, keeping the cabin clean, taking tea to the wheelhouse, and making himself useful in a hundred and one ways. At the fishing grounds he must lend a hand in working the tackle, handling the fish, and mending the nets as far as he can.

At dawn next morning they approach the fishing ground. The skipper and mate are in the wheelhouse listening on the radio to the skippers of other trawlers conversing as casually as if they were ringing each other up in the same town instead of over hundreds of miles of sea.

'We should find fish today,' observes the skipper.

'Aye,' the mate replies.

The skipper watches the stylus of the echometer moving up and down over a revolving roll of paper (see Chapter 6). At the bottom of the paper the stylus traces a wavy line representing the bed of the sea. Suddenly, just above this line, the stylus begins to make a series of smudgy marks—marks which the skipper knows by experience represent a shoal of fish. Immediately he turns the handle of the engine-room telegraph to signal 'Dead Slow'.

Feeling the boat reduce speed, the crew rush on deck, still chewing their breakfast and fastening up their oilskins, and with practised efficiency unlash the net and move the rest of the tackle into position. As the trawler comes to a standstill, the mate stands by the donkey engine in front of the wheelhouse; and under the skipper's directions fishing operations begin.

The net is cast over the side; and warps to which the net is attached are paid out by the clattering donkey engine, skilfully operated (as described in Chapter 2) by the mate. When this

has been done the trawler moves forward, and in so doing drags the net along the sea bed with its mouth wide open to catch the fish.

The men return to their cabin to finish their breakfast, which by now is quite cold, and then begin erecting 'pounds', or wooden pens, on the deck to hold the fish until it can be packed in the hold below.

After some time the trawler slows down, and the donkey engine coughs back into life to haul in the net. The warps are run in; and, when the net appears, the men lean over the side and tug it aboard with their hands—a task which, as we shall see, often requires brute strength. Finally, when the bulk of the net is aboard, the mate tugs a lever on the donkey engine, and a huge mesh bag at the end of the net, called the 'codend', swings over the deck. Another member of the crew opens it out —and thousands of glittering fish cascade into the pounds.

The crew hurriedly repair any damage that may have been caused to the net, and then shoot it over the side again for a fresh trawl. While this is in progress the men gut the fish with their knives and then clean it and pack it in layers of crushed ice in the hold. They work at great speed, seldom uttering a word in their hurry to get the deck cleared before the next catch is hauled in.

The trawler slows down again; the donkey engine rattles; the net is hauled in, and once again the writhing harvest of the sea is released.

By now the sea has risen and spray is blowing across the deck into the men's faces. But the crew seem hardly to notice this: they wipe the stinging salt water from their eyes from time to time and carry on with their jobs. Trawling continues throughout the day, the nets being repeatedly cast and then hauled in again with a fresh catch of fish.

At last the gear is lashed down and the final catch of the day is

stored in ice. The men stumble aft and put their oilskins away, and then clamber wearily into their bunks for some well-earned sleep, leaving only the watch on duty.

At first light the fishermen return to their toils. They may remain at sea for perhaps days or weeks, the period varying with the fishing grounds and their distance from the port.

As the fishing boat returns to port, with the gulls wheeling and screeching around her masthead, there is great excitement. The womenfolk and children hurry down to the quay to greet the fishermen. The owners of the vessel anxiously inquire whether they have had a good harvest. The thought in everyone's mind is: how much will the fish fetch at the auction? For every pound realized each member of the crew will receive a 'poundage' payment in addition to his weekly pay.

The fish is speedily unloaded from the hold and packed in aluminium 'kits'. Next morning merchants will bid for these kits at the auction and dispatch the fish to the inland fish markets (described in Chapter 9), which may be a hundred or more miles away.

For a time there is great activity at the port, but gradually the excitement dies down. The concrete floor where the fish has been landed is sluiced with hoses. Engineers and technicians go aboard to inspect the engines and radio and radar equipment to see if any repairs are needed. And the crew hurry home, leaving their nets draped from the mast to dry, and the tackle neatly stacked on deck in readiness for the next trip to sea.

CHAPTER

2

From Rock Pool to Trawl Net

TODAY fishing is a scientific industry of great skill; and the fishermen, who so often put to sea in the most cruel weather conditions, are renowned for their courage and daring—as were their fathers, grandfathers, and many generations before them. For centuries sons have followed in the footsteps of their fathers, boys going out in the boats at a very young age to watch and learn, with no thought of following any other trade. In many a family at the fishing ports of the world every man is a fisherman; and for them and their womenfolk fish is their lifeblood.

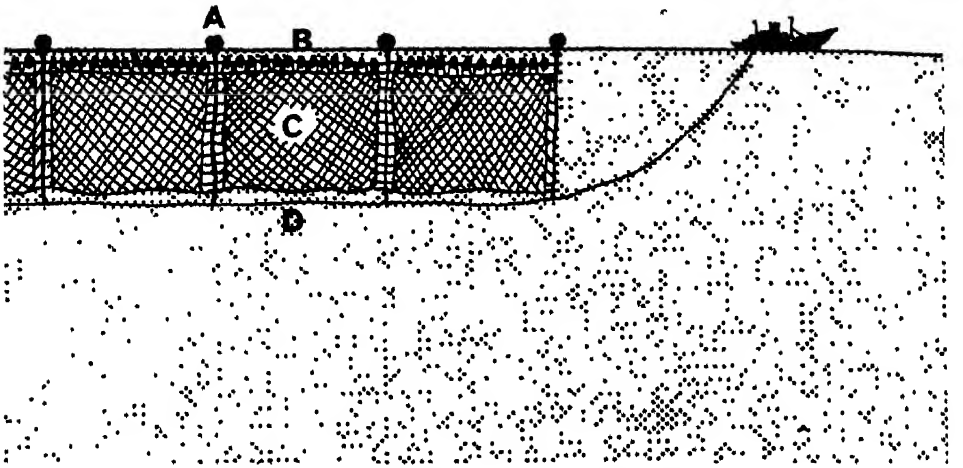
This great tradition has sprung from the humblest beginnings when, in the Stone Age, people living by the sea endeavoured to satisfy their hunger by catching fish with their hands. Clad in skins and furs, they would search for crabs and for other forms of fish left behind in pools by the receding tide; they would also prise shellfish from the rocks and eat these raw, just as people eat some forms of shellfish today. High seas, however, often made it impossible to explore the rock pools; and again and again the fish would slip through their fingers just when they thought they had found their next meal.

So men began to devise other ways to catch fish. They found that pronged spears or harpoons were better than human hands for catching fish in pools and streams. Later they learned to fish with gorges—bait-holders of wood, bone, or horn which they pointed at each end. The gorge would be covered with meat, or the flesh of shellfish, and lowered by a thong into the water—until some greedy fish attempted to swallow it whole and suddenly found itself jerked out to the surface. The gorge was the forerunner of the fish-hook; and specimens of this primitive implement may be seen in many museums.

The gorge, although an improvement on the spear and harpoon, often failed to hold the fish, and so fishermen began to make bone fish-hooks similar in shape to the ones used today. Noticing that fish swim up rivers in shoals, they also began to build traps to catch them. They made these of loosely woven basketwork; and they staked out their traps in shallow water to catch the fish as they came in with the tide—a practice still adopted by salmon fishermen on the Rivers Wye and Severn and in other parts.

The next step came when Stone Age fishermen realized that beyond the shoreline there were more plentiful fish to be caught. They then made real nets, and went fishing in rough boats which they hollowed out of tree trunks. Instead of staking traps across rivers, they suspended the nets from their crude boats, and caught their fish in much the same way as the fishermen of today. Their boats and tackle were, of course, very primitive by comparison with the modern fishing boats, which are often equipped with the latest electronic devices, refrigeration plants and powerful diesel engines. Nevertheless those early fishermen showed great enterprise. They even discovered, when making their nets, how to tie a knot that will not slip when wet—the famous 'sheet bend' knot, well known to every Boy Scout.

And so fishing gradually developed into a skilful craft.



A HOLLOW FLOATS C SECTION OF NET
B CORK BOBBIN FLOATS D WARP

Today the fishermen of Britain are mainly engaged in two kinds of net fishing: drifting for 'pelagic' fish and trawling for 'demersal' fish. Pelagic fish swim near the surface of the sea and include 'fat fish'. These are fish with oil distributed throughout the body, unlike the demersal fish whose oil is stored in the liver. Herrings, mackerel, pilchards, and sprats are pelagic fish. The fishing boats used to catch such fish are called drifters because once their nets are shot down wind they drift with the wind and tide.

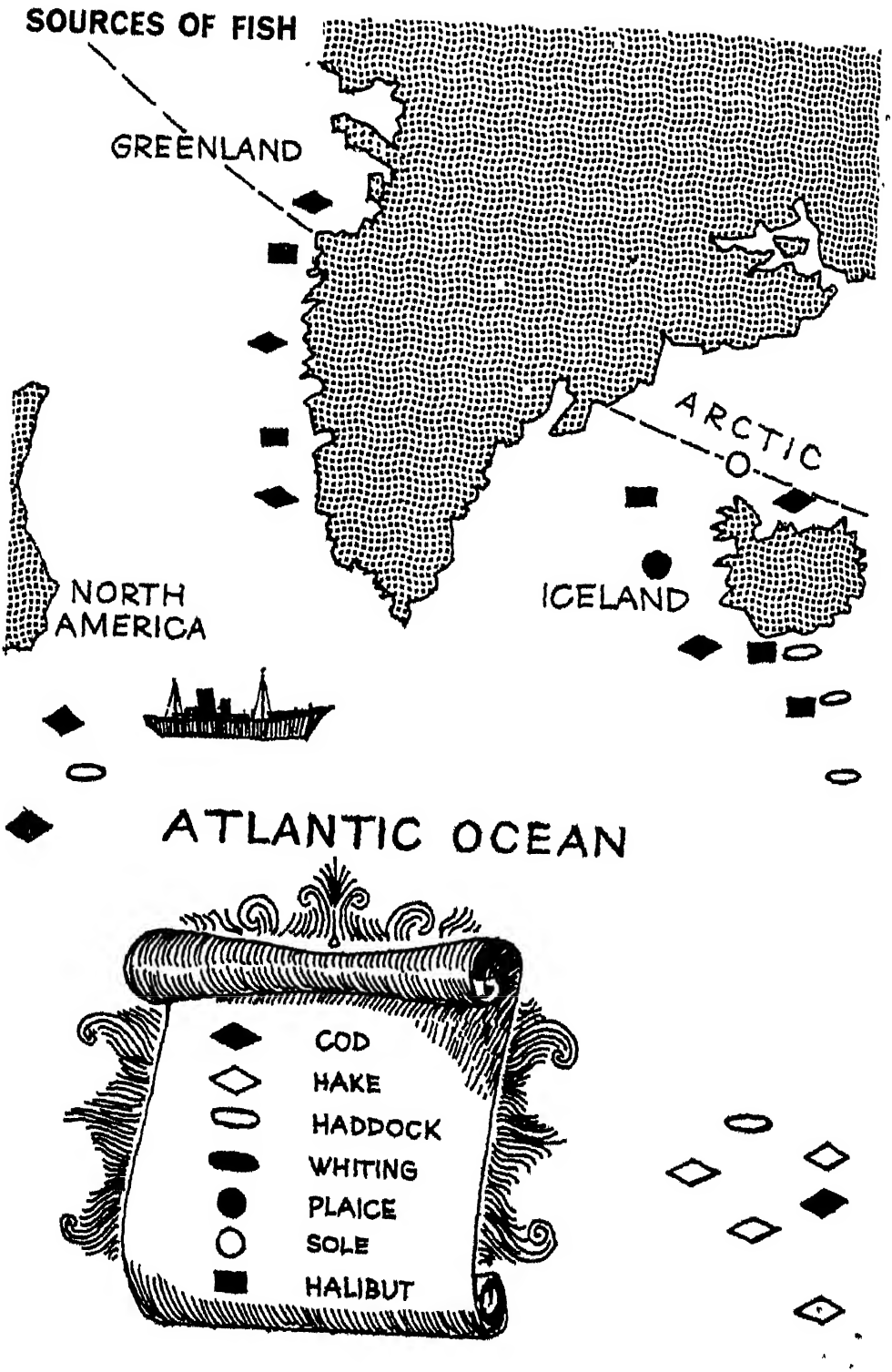
Drifters usually operate within about fifty miles of the coast, and yet drifter crews are generally away from home for longer periods than trawler men unless they are fishing from their home port. Sometimes they go quite far afield; for example, in the early part of the season Lowestoft boats go up to Aberdeen after herrings, and later the Aberdeen boats go down to Lowestoft.

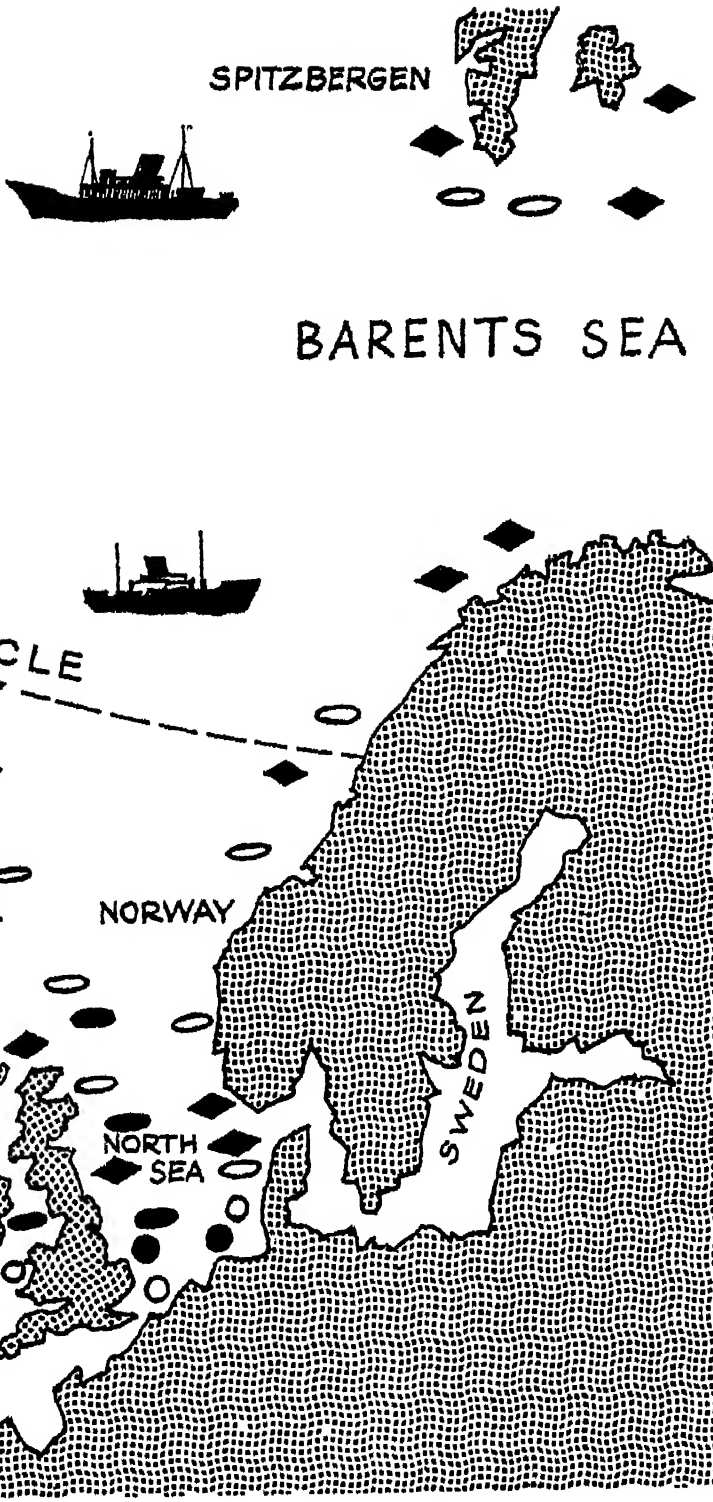
When a drifter reaches a fishing ground her crew keep their eyes alert for patches of 'thick' or oily-looking water, caused by the tiny organisms on which the fish feed when they rise to the surface at night. Another good sign is when sea birds, such as gannets, are seen to be diving. When a likely spot is found, usually late in the afternoon, the fishing boat starts to 'shoot' her nets over the starboard side. These nets may be anything up to two miles in length. As soon as they are paid out the skipper signals the engineer, and the steady thump of the diesel ceases abruptly. The boat starts drifting, and fishing begins.

Below water the net of a drifter looks like a huge cotton curtain hanging down from floats. It is made up of between fifty and a hundred segments, or individual nets, each of which is thirty-five yards long. Each segment is attached to a stout 'warp', or cable, which takes the strain when the time comes for hauling in. The nets are made up of diamond-shaped mesh with each 'diamond' one inch across and one and a half inches deep —just large enough for the fish to get their heads and gills through as they swim into the mesh. Once in the net they are unable to back out.

The job of hauling in these nets can take up to eight or ten hours of back-breaking work. The warp linking the nets is pulled in on a capstan, but the nets themselves are taken aboard 'hand over hand'. As they are heaved in the glittering, squirming fish are shaken out of the nets on to the deck, until the men may be up to their knees in fish. A drifter can take in between ten and twenty-five crans of fish an hour in good conditions; and about 1,000 fish go to a cran.

The herring nets of drifters are easily damaged. The worst disaster, apart from shipwreck, that can befall a drifter is for her nets to become entangled with those of another vessel during the night. This, however, is only likely to happen in concentrated areas such as Whitby.


SOURCES OF FISH
GREENLAND
ARCTIC O.
NORTH AMERICA
ICELAND
ATLANTIC OCEAN
COD
HAKE
HADDOCK
WHITING
PLAICE
SOLE
HALIBUT

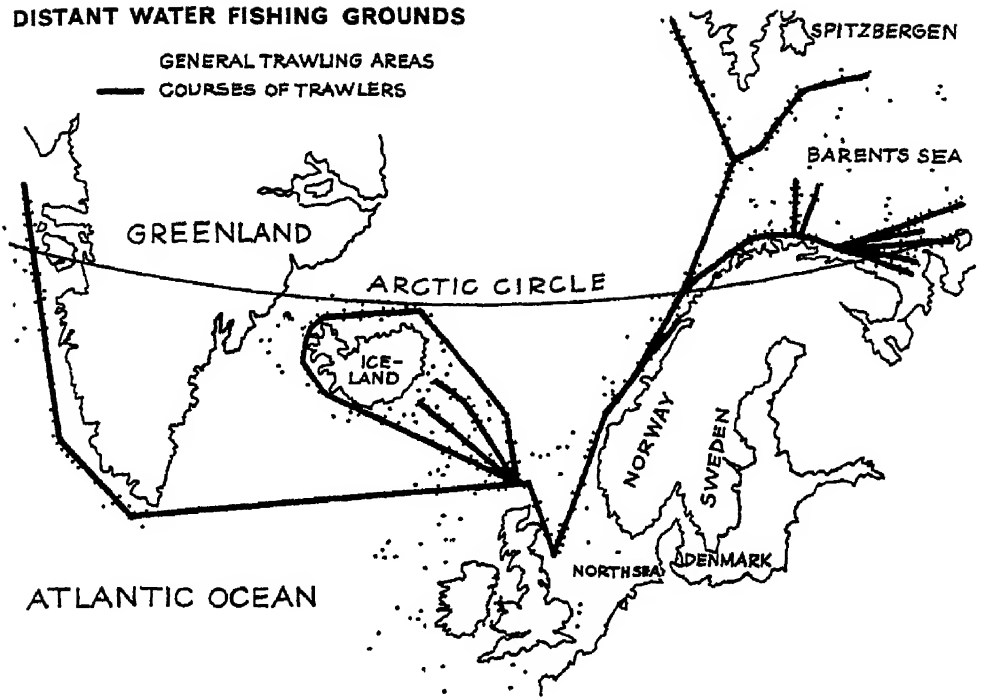

SPITZBERGEN
BARENTS SEA
CIRCLE
NORWAY
SWEDEN
NORTH SEA

Demersal fish live near the sea bed. These include haddock, hake, and whiting as well as all flat fish such as sole, plaice, and halibut; and they provide two-thirds of the fish eaten in Britain.

Trawling for demersal fish (described in Chapter 1) is carried on in all waters around the British Isles, and very much farther afield. The most adventurous form of fishing is done by the distant water trawlers which sail to the far fishing grounds off Iceland and Norway, up beyond the Arctic Circle to the Barents Sea, to the grounds off Spitzbergen and the south-west coast of Greenland. Some trawlers go right across the north of the Atlantic to the coast of Newfoundland. They may cruise over 1,000 miles from their home ports of Hull, Grimsby, and Fleetwood, burning up 300 tons of fuel oil in their engines during their three weeks at sea. The crews of these trawlers often have to operate in appalling weather conditions: so cruel is the cold that they have to use special steam hoses to thaw the solid blocks of ice from their tackle before they can fish.

Distant water fishing is becoming increasingly important, and now accounts for half the trawl fish landed. Closer to home, middle water trawlers fish off the Faeroes; they are usually away at sea for about a fortnight. Near water trawlers, whose expeditions take between a week and ten days, confine their fishing to the North and Irish Seas, the south and west coasts of Ireland, and the north and west coasts of Scotland.

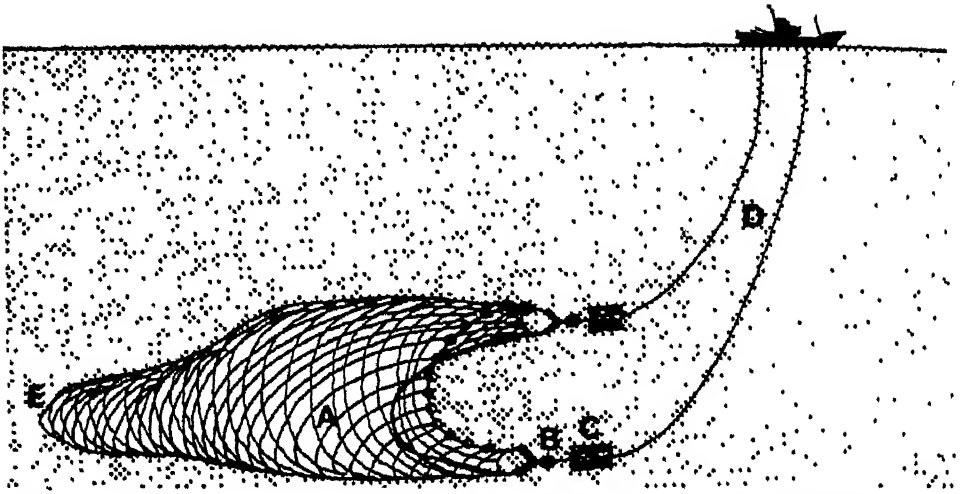
Although trawlers fish throughout the year, there are seasons when certain areas are more intensively worked. For example, cod congregate off the coast of Iceland to spawn between February and April; and so at that period fleets of trawlers naturally concentrate on that area. Likewise between January and March similar congregations of fish are found off the Norwegian coast. Young codling are abundant around Bear Island and off Spitzbergen in the summer and autumn, feeding on the



shrimps that swarm in those northern waters during the period of the 'midnight sun'.

There has long been some prejudice against trawling. This goes back for centuries, for in 1376 a petition was presented to King Edward III begging him to prohibit the use of a net called a 'wondyrchoun' on the grounds that its heavy, long iron 'presses so hard on the ground that it destroys the living slime and plants'. The fishermen feared that the fish eggs on the slime would be crushed, and that in consequence the fish would be driven from their natural feeding grounds.

There is still a certain amount of opposition to trawling round the coasts of Britain, but the grounds for such opposition have been greatly reduced by the type of trawl net in use today. The net of a modern trawler has a huge bag 160 feet long with a mouth eighty feet wide; and, as we have seen, at the end of this bag, or 'belly', there is a smaller tapering bag called the



A BELLY
B ROLLERS
C OTTERBOARDS
D WARPS
E CODEND

'codend' which holds the fish. The mouth of the net is held apart by two 'otterboards'—wooden boards, about ten feet long and five feet wide, which act as underwater kites, planing outwards and thus keeping the mouth open as the net is dragged.

Each otterboard is attached to a warp of steel cable which pulls the net along the sea bed on rollers fitted by rope at the bottom of the mouth. One warp leads to a pulley mounted on an iron frame, known as a 'gallows', at the forward part of the trawler; the other to a gallows at the aft. Both cables are controlled by a winch—the donkey engine, which is usually mounted in front of the wheelhouse—and as much as a mile of cable may be carried in a trawler.

When the trawler reaches a suitable area to fish, her skipper brings her to a standstill broadside to the wind. The heavy net is then shot to the windward, and the boat slowly drifts away from the net, thus preventing its becoming entangled with the propeller during this tricky operation.

Under the direction of the mate, the warps are paid out through the gallows until the otterboards are just under water. Having checked that everything is in the correct position, the mate then gives the order to go ahead. The trawler moves forward and the cable runs through the pulleys of the gallows until enough warp has been paid out. This usually amounts to about three times the distance between the vessel and the sea bottom.

When the winch stops, a heavy iron hook, known to trawlermen as the 'messenger', is passed round both warps to enable them to be brought together and locked in a towing block aft. After this has been done and final adjustments have been made to ensure that the warps are of equal length and will pull the net evenly, the engines are set to the towing speed of three knots, and the trawl starts.

A trawl may last as long as three hours. Then comes the skilful job of drawing in the nets. The mate shouts the order 'Knock out!' Immediately the third hand levers off the catch of the towing block with a crowbar, causing the warps to spring apart—a most dangerous operation which, if mishandled, can cut a man's arm off. The winch reels in the steel cable until the otterboards reach the gallows. By now the trawler is drifting broadside to the wind. The net is hauled in over the side until the codend appears, the fishermen eyeing it anxiously to see how rich is their harvest. The net is hoisted over the deck, where the 'pounds' have been erected—and then comes that dramatic moment already described. A deck-hand releases a line to open the codend—and the fish fall into the pounds like a living silver waterfall.

Although this is a most spectacular sight, it is not always all joy for the fisherman. In the rigours of winter they may have to battle against cruel seas and howling gales. In the Arctic fishing grounds a shrieking wind may whip the freezing spray off the

crests of the huge waves and send volleys of tiny ice pellets into the faces of the men as they hook their fingers into the mesh of the net and heave it over the rocking side of the vessel. Even in summer, when the sea is calm, the fishermen may have to contend with hazards or mishaps.

Another way of fishing is by seine nets. The idea here is to encircle the fish. In their simplest form these nets can be used from a beach. A rowing boat goes through the surf, paying out net; it makes a half-circle round the coastline, and, on reaching the shore again, the fishermen haul it in from both ends. Floats at the top edge keep the seine hanging like a curtain in the water —in just the same way as the drift nets.

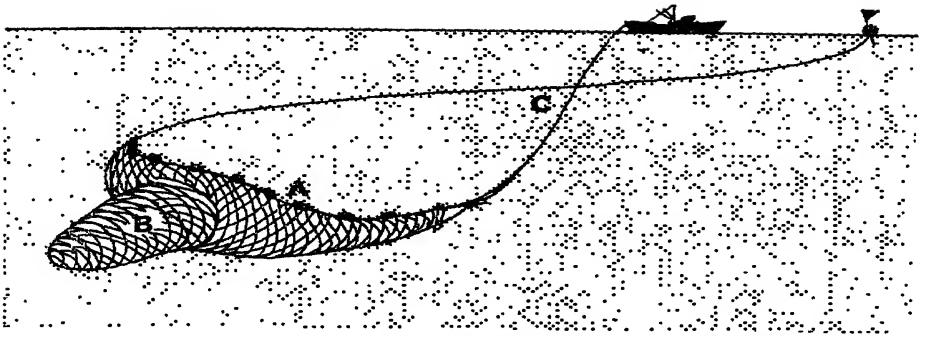
This method of fishing has been used in Cornwall since before the Roman invasion; and it is believed that the ancient Britons learned the technique from the Phoenicians when those adventurous Mediterranean traders used to visit Britain for cargoes of tin ore.

Today demersal fish are caught by seine nets shot from fishing boats between fifty and sixty feet in length which usually stay at sea for a week. The gear consists of two warps, often measuring nearly a mile, and a net about 200 feet wide. In the centre of this net is a large 'pocket' for the fish, similar to the codend of a trawl net. This is known as 'Danish seining' because it started in Denmark.

The end of one of the warps is attached to an anchored buoy. The seiner then moves off at full speed, paying out the warp until it is all used up. The net then follows it over the side and lies in position across the tidal flow. When the net is shot, the seiner heads back to the buoy running out the second warp. Thus a gigantic loop is made of warp and netting. Finally, both warps are hauled in together, dragging the net to the boat in such a way as to enclose all the fish within its confines.

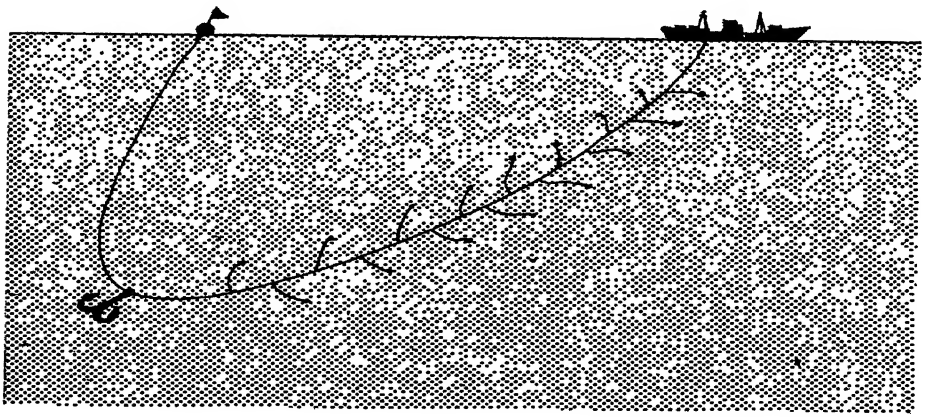
Seine fishing, adopted by British fishermen in 1921, requires

SEINING



A FLOATS B POCKET C WARPS

LINING



C

great skill since everything depends on placing the net in exactly the correct position.

Another form of seine netting called 'ring netting' is sometimes used to catch herrings. Boats usually work in pairs, and when one has located a shoal it immediately shoots its 300 yards of net in a circle round the fish. The second boat races to pick up the end of the floating net and tows it back to the first boat. Then the haul begins.

The net is pulled in at each end; it is also pulled from underneath by means of a couple of warps attached to the lower edge of the net. In this way the fish are trapped in a small 'ring' of net below the water. The second vessel takes up position beside the first and, holding off by means of wooden beams, makes one edge of the net fast to her rail and takes the fish aboard.

Of course, fish are still caught with hooks and lines, but this method is now practised mostly by inshore fishermen with motor-boats. It is hard work: a line may be up to two miles long with a thousand hooks to be baited by hand. A few large long-line fishing vessels still operate in distant waters for fish such as halibut; they fish on grounds too rocky to be trawled.

Mackerel are fished off Cornwall on lines containing up to twenty-five hooks to which feathers are tied—a method known as 'feathering'.

Inshore fishermen, in addition to line fishing, are responsible for nearly all of Britain's supplies of crab, lobster, and shellfish.

CHAPTER

3

Fishing Boats

THERE are three main types of fishing vessel: boats used for inshore and herring fishing; near and middle water craft; and distant water trawlers. The inshore and herring boats are designed as drifters or seine netters, and can be adapted for various kinds of fishing.

There are many variations of each type; and the boats may also vary in design according to the locality where they work. For example, most Lowestoft trawlers have gallows on each side, so that fishing can be done from either port or starboard; whereas most trawlers can fish from one side only. This means that the Lowestoft fishermen can shoot a net to starboard immediately after hauling in a net to port and start a second trawl without waiting to repair the damaged net from the first trawl. In this way they are able to cram more fishing into their hours at sea. But of course this also causes the fishermen a great deal of extra work: they must work at full pressure repairing the nets during each trawl and can seldom let up.

At present the distant water fleet comprises 230 vessels over 160 feet in length. There are 260 vessels of between 110 and 140 feet engaged in middle water fishing, and over 200 of between 80 and 110 feet engaged in near water fishing. The

inshore and herring fleets consist of about 7,000 boats under 80 feet in length. Fishing boats of British design and construction have a high reputation for seaworthiness and general efficiency and are sold to countries all over the world.

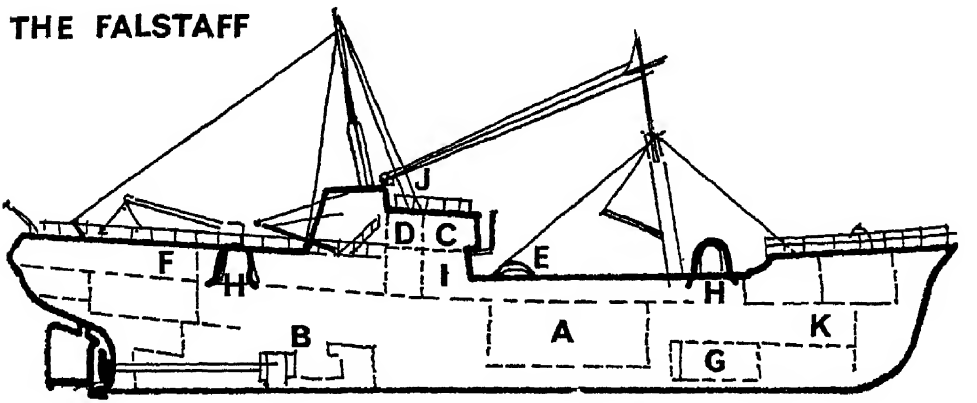
As much thought and experiment go into the design of a modern fishing vessel as into the planning of a large merchant ship; indeed a fishing boat presents more problems. Fishing boats may have to ride out storms rarely encountered by passenger liners; and they must remain stable no matter what their trim may be. They must be safely balanced whether their holds are full or empty, when travelling at full speed or when hove to in the middle of the open sea; and, perhaps even more important, when their nets are being hauled aboard. Fishing boats must also be extremely sturdy, wellnigh indestructible: the great distant water trawlers have little or no chance of seeking shelter from the battering storms in the Arctic seas.

Not only is great attention paid to the basic design of a fishing boat, but considerable thought is also given to the comfort of the crew who have to spend so much of their lives at sea. In the old days of sail the fishermen lived in the most miserable conditions, without even adequate facilities for washing. Modern boats are very different. The walls of the cabins are neatly panelled to give a much more homely effect than metal plates and rivet heads; and although space is inevitably restricted there are good facilities for washing, for drying clothes, for cooking proper meals, and indeed for all the domestic chores.

The trend in modern trawler design is to place a large amount of superstructure at the rear of the vessel. This section usually includes the crew's quarters; and this allows the men more room than in the older type of boat, where the crew sleep in the forecastle. An old design of trawler can easily be distinguished

from a modern boat because, apart from her wheelhouse, masts and funnel, nothing else rises above the level of the deck.

The distant water trawlers, some of which are over 200 feet in length, are financially the most important group of fishing craft in the British fleets of today. They are able to cruise for three weeks at a time, and, as already mentioned, they operate in the



A FISH HOLD
B ENGINE ROOM
C WHEELHOUSE
D RADIO ROOM
E ELECTRIC WINCH
F CREW'S QUARTERS
G OIL FUEL TANKS
H GALLOWS
I SKIPPER'S QUARTERS
J RADAR SCANNER
K COD LIVER PLANT

The *Falstaff* is one of the best equipped modern distant water trawlers afloat

waters off Iceland, Greenland, northern Norway and Bear Island, and in the Barents Sea.

One of the best equipped modern distant water trawlers afloat is the *Falstaff* of Hull. Driven by diesel-electric engines, and with a gross tonnage of about 900 tons, the cost of a vessel of this type is between £350,000 and £380,000—a figure ten times as great as the cost of a pre-war trawler.

She has three eight-cylinder diesel engines to provide the electricity for the motor, which can drive her at over fifteen knots. She also has an auxiliary boiler for providing steam for melting Arctic ice off her deck and gear, for boiling cod livers at

sea for their oil, and for keeping the interior of the ship warm. The cod-liver-oil plant, which extracts the oil and stores it in tanks, is in the forward part of the vessel. Behind this are the fuel oil tanks, with a capacity of 205 tons; the *Falstaff* uses about five and a half tons of fuel oil a day.

In the middle of the ship, just forward of the wheelhouse, is the fish hold. This has a capacity of 18,500 cubic feet and is constructed of aluminium alloy, with fitted shelves on which the fish is stored on ice, the temperature being maintained at 33° to 34° Fahrenheit.

In the rear half of the trawler is the engine-room; and above this is the superstructure comprising the wheelhouse, radio-room, skipper's suite, and crew's quarters. The crew's accommodation includes single, double, and six-berth cabins. Normally the *Falstaff* carries a crew of just over twenty, but she can accommodate more if necessary.

Just in front of the wheelhouse is the electric winch, which has two drums each containing about 850 yards of $3\frac{1}{8}$-inch steel wire rope—the trawl warps, which can tow the trawl along the sea floor at a maximum depth of 2,000 feet.

In 1959 the *Falstaff* won the Silver Cod Trophy—an award presented annually by the British Trawlers' Federation to the skipper, crew, and ship landing the greatest quantity of fish during the year. To gain this honour the *Falstaff* landed 400,000 stones of fish, which sold on the market for £130,000. To catch this amount she was away from Hull for 332 days in the year.

The *Falstaff* is a conventional vessel in that she shoots her nets over the starboard side. Less conventional trawlers which fish from the rear are now becoming very popular. These stern trawlers, as they are called, differ in appearance from ordinary trawlers because their wheelhouse and accommodation are forward, while the rear of the vessel comprises the deck where

the men work on the fish. Most stern trawlers have a ramp at the rear down which the trawl net is shot and later hauled up by its warps when full of fish.

An advantage of the stern trawler is that she does not need to shoot and haul in her nets with the sea abeam, and consequently the crew can work in more sheltered conditions. When not in use the ramp is closed off from the sea by steel doors—doors similar to those on the ferry boats which transport cars across the English Channel.

As with the conventional boats, there are variations in a stern trawler. A ramp is not suitable for small vessels where the working length of the deck is restricted, so other systems have been evolved. One of these is the 'Unigan' system, which was first used towards the end of 1959, having previously been tested with a quarter-sized model at a Gateshead shipyard, in the way that models of all new fishing vessels are first tested in artificial wave tanks.

Under the Unigan system a massive steel gantry or arch is fitted at the rear of the vessel. This gantry resembles an inverted 'U', and is placed over the hydraulically operated stern doors through which the trawl net is shot; and the twin screws and rudders are placed as far forward as possible to ensure they do not foul the trawl gear. The gantry acts as the gallows for the warps. Operated by hydraulic rams, it swings out over the stern while the net is being winched in; and then, when the codend has been hoisted, it swings back over the deck and releases the fish into the pounds.

CHAPTER

4

The Humble Herring

THE modern fishing industry of Britain and of many other countries, notably Holland, was built up largely around the humble herring for which, as we have seen, there are now special boats. Indeed, the herring fishery has played a part in shaping the history of Britain and the British Commonwealth, as well as that of Holland. Wars have been fought over the herring. The Dutch, with whom Britain once went to war over this fish, declare, 'Amsterdam was built on herring bones'.

Herring fishing started at Yarmouth in Saxon times—and Yarmouth is still one of Britain's most important herring ports. The herring first became popular because in those days there was no way to preserve meat for the winter except by salting it. People grew tired of eating salt meat and very little else for long months on end. They needed other forms of fresh food for the winter as an alternative to meat—poultry, game, and freshly caught fish. The herring was a popular and necessary food because it is particularly nutritious, and so it helped to combat diseases caused by poor or insufficient food.

At first the herrings were only eaten fresh from the sea, but in course of time attempts were made to preserve them by exposure to the sun. But this can be done only with fish which

store their fat in their livers; it was not possible to preserve herrings in this way because their rich oil is contained in the body tissues. However, after many unsuccessful experiments British fishermen finally learned the secret from French fishermen, who, in the thirteenth century, used to fish in the English Channel and land their catches at ports along the South Coast. The French brought barrels of salt with them to pickle their catches. The English fishermen watched with curiosity, and decided to try this method with their own herrings.

The idea was successful. They packed their herrings in tubs of brine and took them inland to the market towns by pack-horse. Their herrings soon became one of the most popular foods in the country. One reason for the great demand was that England was then a Roman Catholic country; and there were then more than 150 fast days in the year when meat was forbidden to Catholics.

The Dutch were the first to discover other methods of curing herrings. They guarded this secret closely, and for three centuries their cured herrings were exported all over Europe. Through the humble herring Holland enjoyed great prosperity and rose to be a world power; and this is why the Dutch say that Amsterdam was built on herring bones.

Bitter rivalry developed between the fishermen of England and Holland over the herring. There was also trouble with the French. In 1429, when the English were besieging Orleans during one of their many wars with France, the French tried to seize five hundred cartloads of herrings on convoy to the English army. But the English men-at-arms and archers stood firm by their long line of carts and beat off the attack, defeating the French in a skirmish that became known as the 'Battle of the Herrings'.

Meanwhile the Dutch encroached on the fishing grounds of the English. Their 'busses', as their fishing boats were called, began to venture right up to the mouth of the Thames in

pursuit of the herring, while hundreds of others followed the thick shoals off East Anglia. These foreign fishing fleets in English waters, besides angering the local fishermen, also infuriated the British Government. Finally, the Government decided to build up a powerful naval fishing protection force. This force, which was manned by fishermen, was later to help to defeat the Spanish Armada.

In the days of sail a naval force was badly needed to protect the fishermen from their many dangers. Not only were they at the mercy of the sea in their small open sailing boats with no means of communication beyond sight of land, but they were also in constant danger of attack from pirates—and from the warships of rival nations. During the wars with Spain the herring fleets were frequently chased by the great Spanish galleons, with their silk banners, glittering giltwork, and tiers of cannon. The Spaniards used to kidnap the west country fishermen from their boats and question them on the movements of the British Fleet.

But the worst and more lasting danger came from the pirates. At one period, in the seventeenth century, some five hundred French pirates, known as 'Dunkirkers', were cruising in British waters, harassing the English fishing fleets; and later Algerian corsairs also brought terror to the English Channel. The corsairs were hunting for slaves; they seized many fishing vessels and carried off their crews to the slave market of Algiers. Sometimes these Moors landed and raided the fishing villages themselves, and took away the fishermen's daughters and other young girls to become servants in the harems of the rich men of North Africa.

So great were the dangers that the fishermen always worked their nets with a man up the mast on the look-out for a hostile sail. At the first sign of danger, the crew would cut the warps and make a dash for the safety of a port.

English fishermen lived in such dread of the pirates that many often refused to put to sea at all. Consequently the fishing industry seriously declined. However, the naval protection force engaged the raiders in many fierce battles, and finally drove them from British waters. The industry then picked up again.

But the troubles with the Dutch continued for a very long time. During the reign of Charles II over a thousand Dutch busses regularly victualled at Yarmouth in defiance of regulations. These busses were not very fast, and so the Dutch built special sailing boats called 'jaggers' (the forerunner of the yacht) to race into and out of port. The British naval forces constantly attacked the Dutch busses at sea: and this battling over the herring was one of the many factors which led to open war with Holland at the end of the seventeenth century.

Until quite recent times the fishermen led a very hard life, with very little reward for their long hours of dangerous and exhausting work. Perhaps on account of this most fishermen used, in the past, to look for 'something on the side' to make their lives more stable and secure. Many became smugglers; and there is no doubt that, besides deriving great profit from this, they enjoyed pitting their wits against the Government Excisemen who patrolled the coast in revenue cutters to ensure that they landed nothing more valuable than herrings.

Some fishermen became full-time smugglers, plying their swift craft between the coasts of France and England on moonless nights. Those who were part-time smugglers were known as 'free traders'. During the Napoleonic wars, when British and French men-o'-war were engaged in battle, fishermen from the south and west country ports would come alongside the fishermen of France in mid Channel and exchange friendly greetings as if their two countries were at peace. After some hearty handshaking, kegs of brandy, rum, or wine, and perhaps boxes of

such luxuries as snuff, silk, and above all tea, would be passed from the French vessels into the English fishing boats.

The fishermen would then return to port and, dodging the Excisemen, either land their contraband concealed in baskets of fish, or else anchor it in kegs just below the surface of the water in some sheltered cove. At nightfall the smugglers would return, fish out the kegs by means of a grapple, and take them to a point on the coast where teams of ponies were waiting to carry them inland. This was always a most dangerous adventure. Sometimes shots were exchanged on dark, lonely beaches and men were killed. But the rewards were great: brandy, for example, fetched six times the price paid for it in France. After the defeat of Napoleon the dangers became greater still: a special Preventive Water Guard was formed to combat the smugglers, and this force developed into the Coastguard of today. Since then smuggling has gradually declined—although even today a fisherman may occasionally pick up 'something on the side' if he gets the opportunity!

This long tradition of trial and hardships has done much to give the modern fisherman his sturdy qualities and individuality.

CHAPTER

5

Fish and the Scientist

FISHERMEN used to assume that they could fish for ever without affecting the number of fish in the sea. They had little or no knowledge of marine life or the habits of fish. Then, just over a hundred years ago, scientists began to make a study of the sea and its creatures. Voyages of scientific investigation were made and research stations were established. Marine biologists began a study of fish migration. They attached discs to the bodies of fish and put them back into the water—on the same lines as ornithologists ring birds—and when a fisherman caught a fish with a disc, he would return the tag to the research station, with a note of where the catch was made.

Scientists and fishermen still co-operate in this way. The fisherman hands over the fish or its tag to the Collector of Fishery Statistics at the port of landing, or else sends it to a laboratory; for this he receives a reward. The payment ranges from two shillings for the tag of a crab to five shillings for the tag of a salmon and ten shillings for the tag of a herring complete with the fish.

The scientists also started to examine the problem of over-fishing; and they soon discovered that the supply of fish in the sea is by no means inexhaustible, as the fishermen had supposed.

From the beginning of this century records of the approximate quantities of fish caught in different districts began to be kept, and these showed a steady decrease in the average landings from trawlers. In the 1930's, at a time when many more trawlers, with improved gear, were putting to sea, the decrease continued, in spite of the fact that fishermen were venturing farther afield to new fishing grounds for their catches.

This led the marine biologists to investigate the possibility that other factors besides over-fishing might affect fish populations. They discovered that a sudden change in the temperature of the sea can have a great effect on fish; a lowering of temperature will often reduce numbers, while a rise in temperature, on the other hand, may bring an increase. An example of this occurred soon after the First World War, when cod had been drastically overfished. In 1921 part of the surface of the Atlantic suddenly became several degrees warmer, and this warmer water moved up to the Arctic fisheries, causing the cod to flourish; indeed a large new feeding ground formed on the shelf round Bear Island. This and other similar observations showed that the warmth of the water greatly affects the breeding habits of most fish; and subsequent experiments have shown that cod can recognize a rise in temperature of only one-tenth of a degree Fahrenheit.

Scientists estimate that, with properly regulated fishing, the annual yield from the North Sea could be increased by some 15 to 20 per cent, and that moreover this increased yield could be obtained at only about two-thirds of the present cost of fishing. The extra yield could be brought about by letting the fish grow bigger; and the costs reduced by eliminating the waste of fuel and the wear and tear of ships and gear at present caused by indiscriminate fishing day and night, Sundays and weekdays, in season and out.

In 1946 the representatives of twelve nations fishing the seas

of northern Europe took a step towards reducing indiscriminate fishing by recommending their governments to bring in new laws regulating the size of the mesh of fishing nets. Their aim was to break the vicious circle where in poor fisheries nets of very small mesh were used, with the result that large numbers of small fish, which should have been conserved for breeding, were caught, thereby making the fishery even poorer. These regulations prohibiting the use of very small mesh came into force in 1954.

In a ceaseless campaign to improve fishing conditions, the Ministry of Agriculture, Fisheries and Food operates research stations at various ports, and the Ministry also operates four research vessels.

The largest of these, the *Ernest Holt*, makes long-distance voyages to the cod fisheries of the Arctic and to other fishing grounds where trawlers may be working; and from time to time she charts all the cod in the area. Her work is also concerned with hydrography—a scientific study of the water—and with the food on which the cod and other fish subsist. Another of the research vessels, the *Clione*, is used for plankton sampling, hydrography, and trawling work; a third ship, the *Platessa*, is occupied in echo surveying for herrings in the East Anglian season; and the fourth ship, the *Tellina*, is employed for sprat and inshore research.

The aim of the research stations and ships, the results of whose researches are available to all fishermen, is to ensure good, regular fishing, year after year; and the scientists are now working to discover some way to predict what future fishing seasons will be like. As more information is available, forecasts may be possible in all aspects of fishing.

Besides studying the fishing grounds and such matters as the plankton on which the fish live and the effects of temperature, the research teams make a close study of fishing equipment.

Frogmen take underwater photographs of nets in action to see which types are the most effective; and the *Ernest Holt* makes regular tests of various types of trawling gear.

A few years ago the scientists took a census of the populations of the different types of fish in various seas. They estimated, to quote one of their findings, that in the North Sea there are 300,000,000 plaice of fishable size, and that no less than 210,000,000 are caught annually in these waters. Fortunately plaice breed at a prolific rate, and so the stock is constantly replenished.

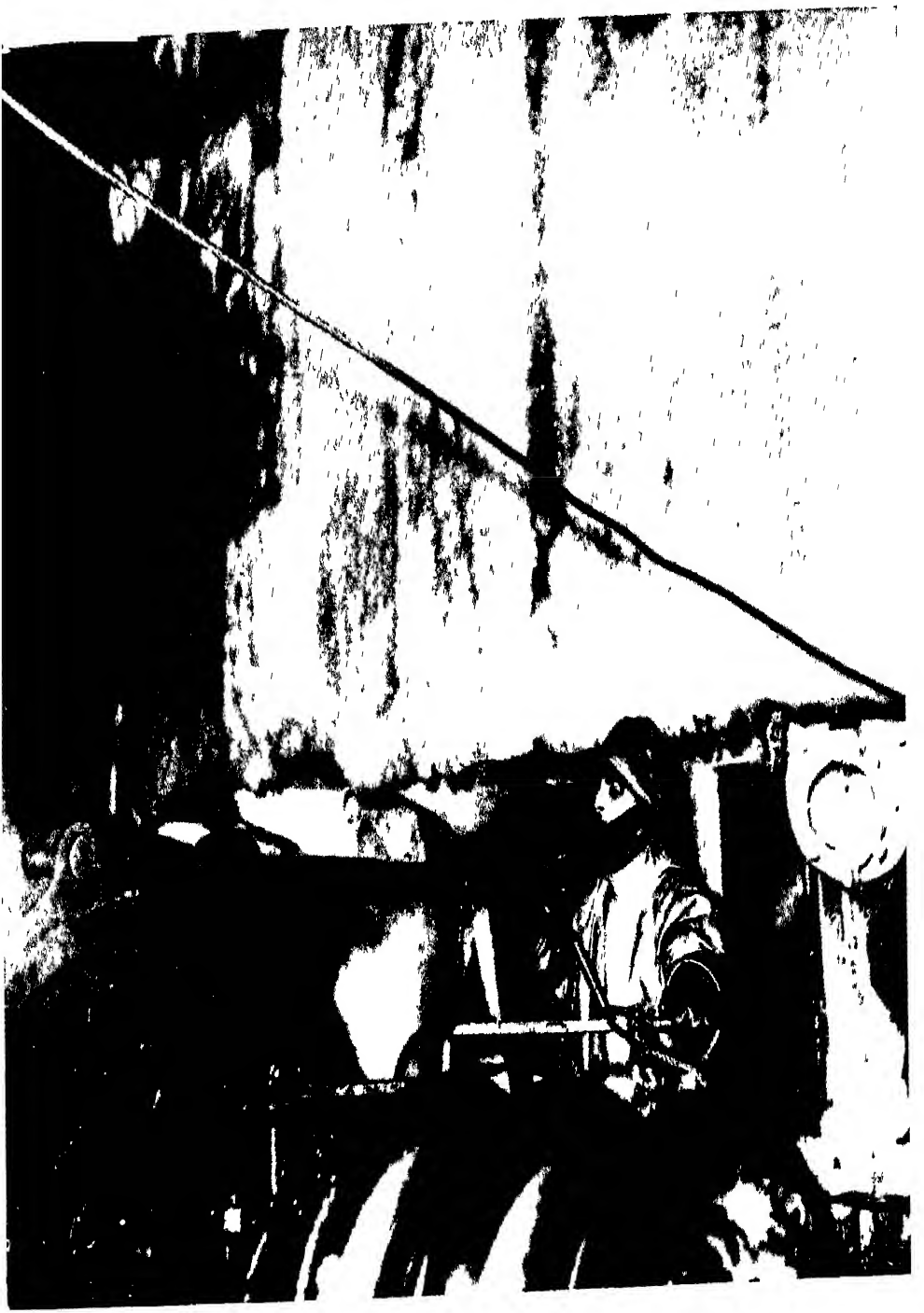
Several methods may be employed to take a census. One way is to count the freshly liberated eggs over the spawning area. Not all the eggs are counted individually, of course; the number is estimated by counting the eggs in a cubic yard of water filtered through a silk net and then making a calculation for the whole area based on this figure.

The experiments with tagged fish, such as plaice, provide another method. On an average 30 per cent of the tags are returned by fishermen each year. Scientists, after making allowance for fish losing their tags and for others not returned, estimate the percentage of fish caught at seventy. They know that 210,000,000 plaice are landed yearly, and so they are able to work out the population figure by a simple sum:

$$\frac{100}{70} \times 210{,}000{,}000 = 300{,}000{,}000.$$

When marine biologists are working on these censuses, they need to be able to tell the age of specimens in order to assess their rate of growth and how long they live. They can tell this by the annular rings of the fishes' scales—in the same way as the age of a tree can be gauged by the annular rings of the trunk. The distance between one year's ring and the next indicates the rate of growth for that particular year.

In the Arctic the deckhand has to work surrounded by sheets of ice.

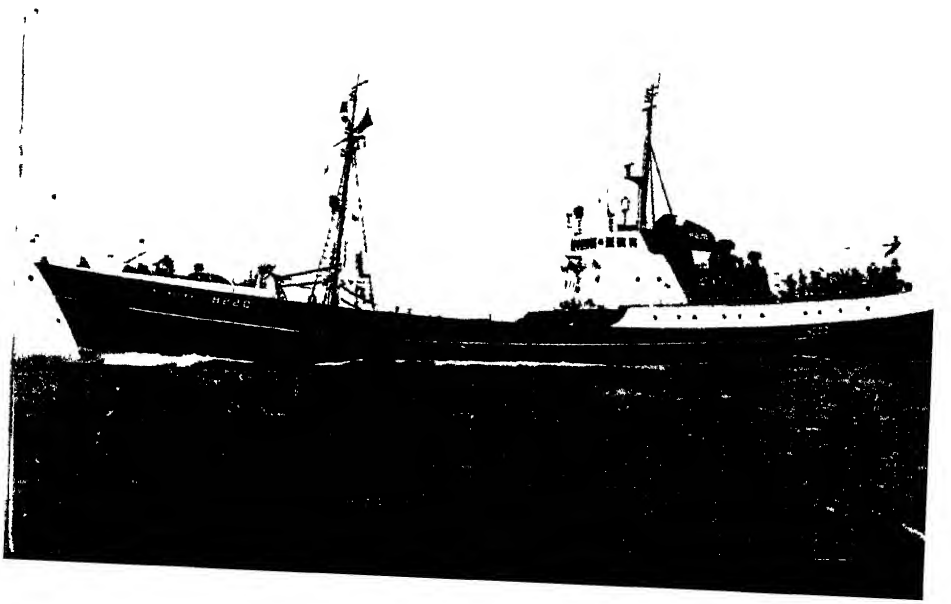


◁ *A seine-fishing boat, from which one end of a net is cast, the other being attached to a buoy and the fish encircled*

▷ *As much thought and experiment go into the design of a modern fishing vessel as into the planning of a large merchant ship Here a new design for a trawler hull is undergoing trials in a testing tank*

◁ *Some seiners also take shellfish Here lobster pots are being prepared for putting overboard*

▷ *One of the most modern types of trawler, which can be distinguished from an old type by the large amount of superstructure*



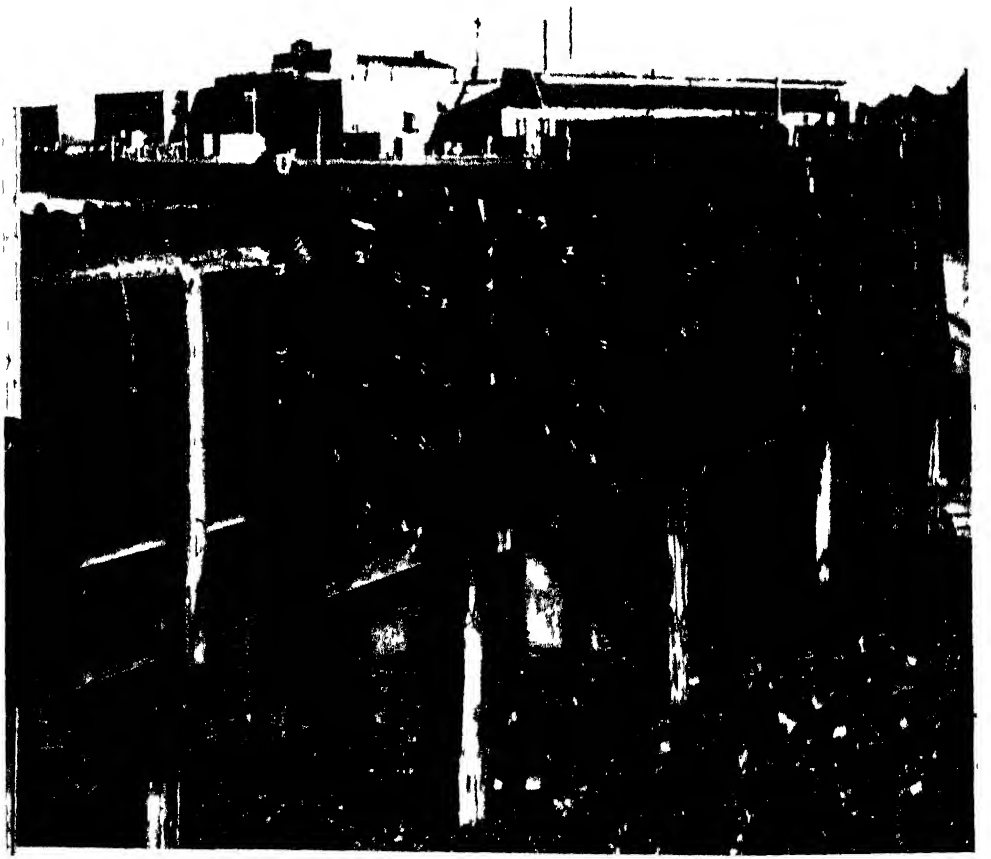
A modern distant water trawler on its way from Hull to the Arctic fishing grounds

A British trawler refuelling at an Arctic port

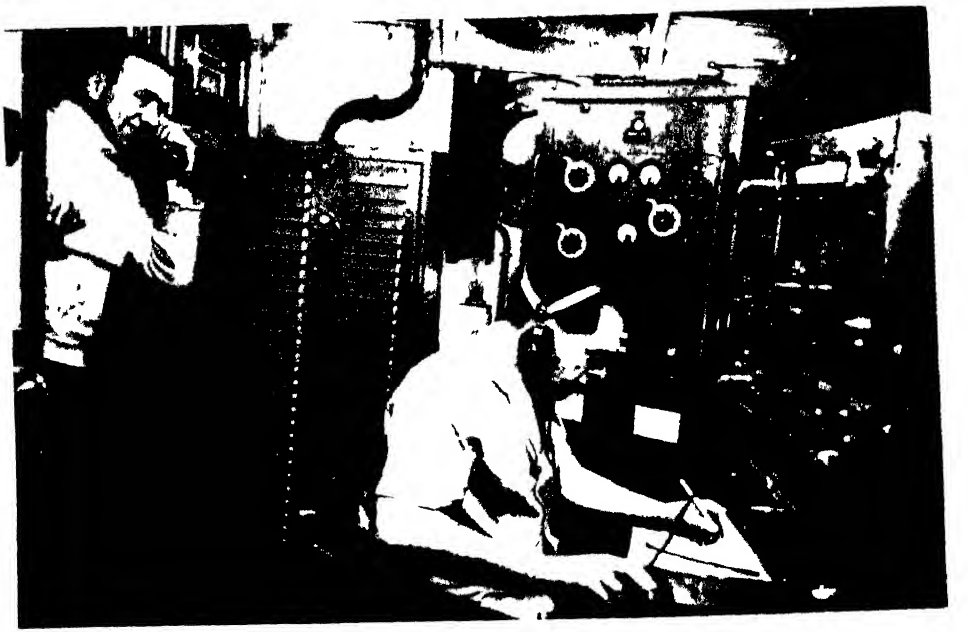
A modern stern trawler, which fishes from the rear. The nets are shot down a ramp which is closed off from the sea by steel doors when not in use

Right: *One of the many scientific devices that help the modern fisherman, a grab which brings up samples of creatures that live on the sea-bottom and so gives valuable information about the feeding habits of certain fish*

Herring nets drying at Yarmouth, where the industry started over a thousand years ago, and which is still one of Britain's most important herring ports



The radio room of a modern distant water trawler It carries as much radio equipment as a large passenger liner



'Sparks', the radio operator, is one of the most valued men aboard He is the link with home, and the man who receives and transmits messages of every kind Besides radio the skipper (left) has the radio-telephone on which to talk to other vessels

Recently a new type of research has started on the effects of radioactivity on fish. A forty-five foot trawler, the *Seascan*, has been equipped as a floating laboratory; in this ship scientists check catches for uptake of radioactivity following the discharge of atomic waste into the sea.

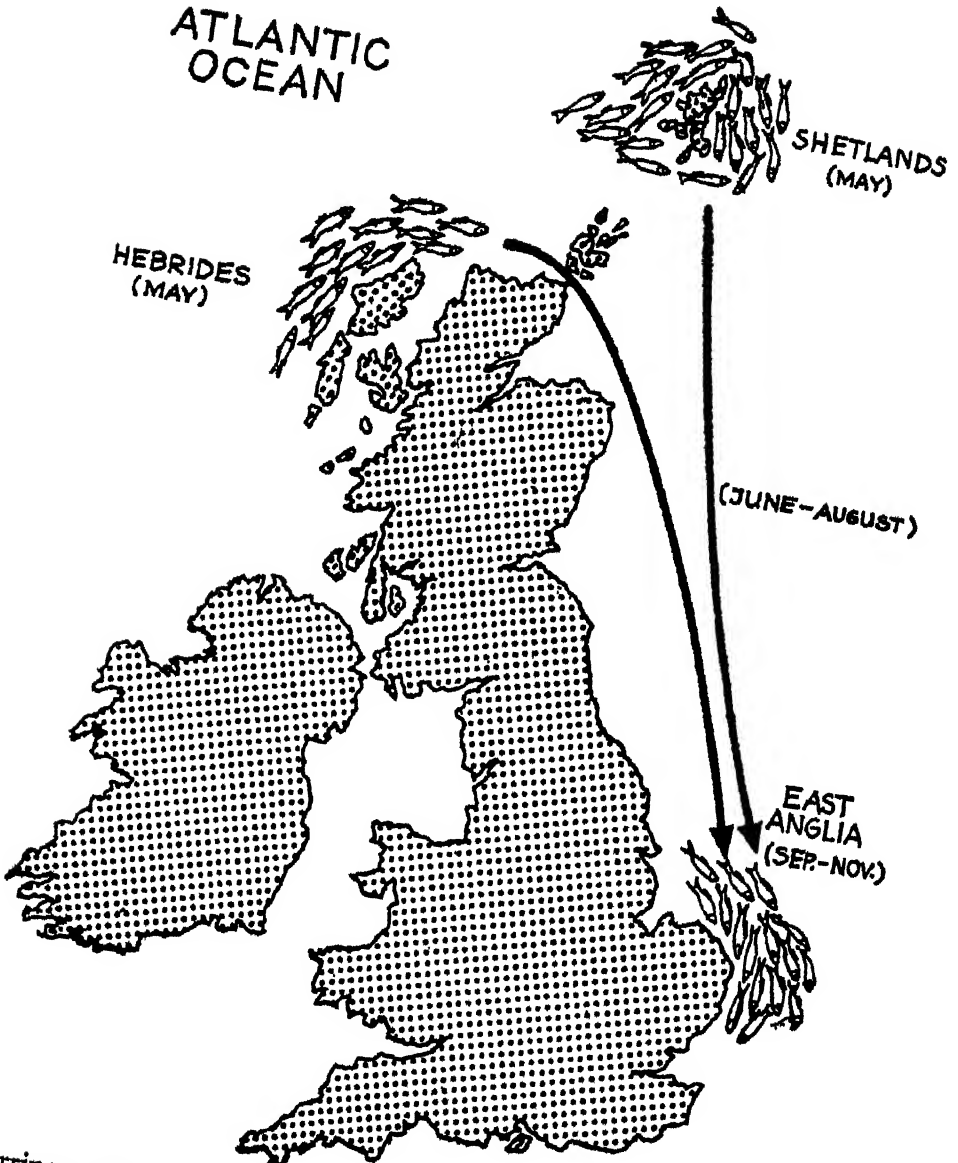
Still further information about the general behaviour of fish is constantly being gleaned by divers with aqualung equipment, who swim through forests of coral and take pictures of the strange and exotic life in the silent world below the waves. These films are usually made in tropical regions, such as the Red Sea or Pacific, where the marine life is colourful and strange.

Yet the life cycle of the ordinary fish eaten in the home—the herring, the cod, or the plaice—is no less fascinating. The humble herring, for example, lives in huge shoals; and each shoal has its own time for migration and spawning. For most of the year the shoals live in the deep water away from the coast, but in spring some instinct tells the fish to travel to the coast to lay their eggs. Scientists believe that the rise in the temperature of the water prompts their migration.

Early in May the fish appear off the north of Scotland, round the Shetlands and the Hebrides. From these islands they gradually swim south towards the coast of East Anglia, where they remain from September until November. The shoals have particular spawning areas, and some experienced herring dealers declare that they can tell where a particular fish has come from simply by looking at it.

There is a theory that the herring shoals follow the course of ancient rivers that no longer exist. It is suggested that thousands of years ago, when England was part of the continent of Europe, the herrings migrated up the rivers in the same way as salmon do today; and that, after England was severed from the continent, the herrings continued to follow the paths of the old

HERRING ROUTES



Herrings arrive off the coast of Scotland to spawn in spring and trave
to the east coast waters in the autumn. Skippers of drifters know their
routes and catch them on their pilgrimage.

rivers, from the deeper to shallower water. The skippers of the drifters are familiar with these herring routes, and this helps them to catch the fish as they make their annual pilgrimage.

When the shoal reaches the breeding ground, the female herrings each lay about 35,000 eggs. These differ from the eggs of most fish in that they are heavier than water and sink to the bottom of the sea.

Like other pelagic fish, herrings surface at night to feed on animal plankton. This is made up of tiny marine animals, fish eggs, and baby fish, which are called 'fry'. In their turn the tiny marine animals—so small that they are not visible to the human eye—live on 'diatoms': microscopic green plants which are really the basis of all life at sea. Some old-time fishing skippers were credited with being able to 'smell out' herrings; and it was probably this plankton on which the fish live that they could smell.

The herring itself has a keen sense of smell, and for this reason it always avoids polluted water. Indeed, fishermen are always careful not to gut fish near a herring ground lest the smell should cause the herrings to swim away when the offal is dumped overboard.

The cod, of the popular 'fish and chips', is another most interesting fish. From April to autumn the cod roams the sea at large, but during the period from February to April it too spawns at special breeding grounds, usually at a depth of between thirty and fifty fathoms in the North Sea, a fathom being six feet. A single female cod may lay as many as 4,000,000 eggs. The cod's eggs, being lighter than water, float to the surface and become mixed up with the plankton; consequently most of them are eaten by other fish.

The young fry from the remaining eggs hatch after a few days—strange little creatures with slender bodies and goggling eyes. Many of the fry are eaten; but the strangest thing happens

to the survivors when they are about an inch long, for they swim down and take shelter from their enemies between the poisonous tentacles of large jellyfish, which sometimes measure as much as six feet across in Arctic seas. Their correct name is *Cyanes capillata*, but they are known as 'sluthers' and 'scalders' by the fishermen, who dislike them intensely because they clog their nets and sting the skin.

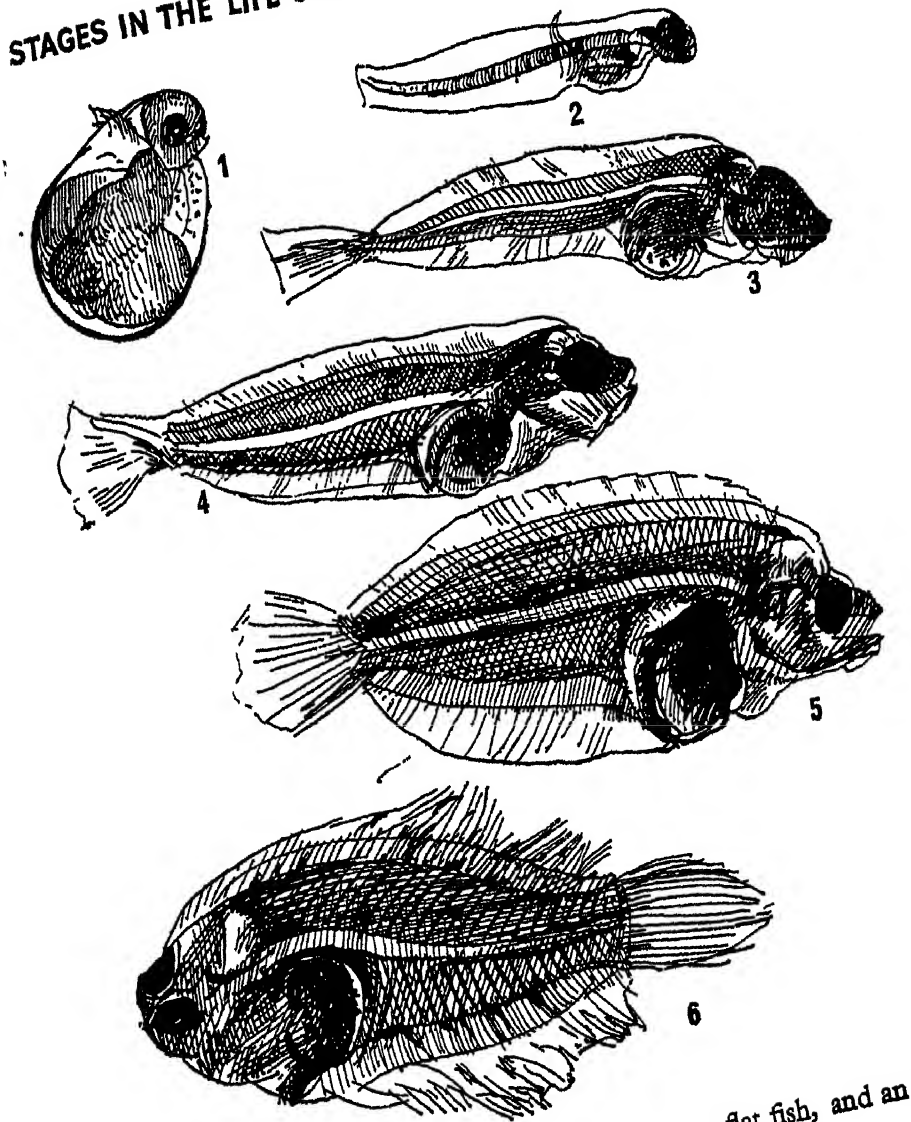
The jellyfish drift with the tides, their tentacles hanging down like lazy, deadly ribbons. Although their tentacles sting and paralyse most fish at a touch, the baby cod seems to be unaffected. The fry nestle among the tentacles, secure from their enemies, for between a week and a fortnight. The young cod then leave the protection of the 'sluthers' and sink to the bottom.

The jellyfish, in the course of their drifting, have carried the fry far from the breeding grounds to shallower waters. Here the young cod, called codling, live for about four years. At the end of this period they return as fully grown fish to the deeper breeding grounds to lay their own eggs. A cod may live for twenty years.

Perhaps even stranger than the cod is the plaice, another demersal fish. The female plaice lays between 50,000 and 200,000 eggs. After a few days the larva appears; and the astonishing thing is that, although plaice are flat, the fry are round fish, like the fry of a cod. The baby plaice has a large eye on each side of its head, and it has no mouth! A large yolk sac, attached to the eyes, keeps the tiny fish provided with nourishment until its mouth develops and it can eat for itself. After about six weeks the shape of the fish changes from round to flat, and it begins to swim upright.

Now comes the most amazing transformation. During the next fortnight the left eye of the plaice starts to move. It travels over the head of the fish and down the other side until it reaches

STAGES IN THE LIFE STORY OF A PLAICE



How the baby plaice changes from a round to a flat fish, and an eye moves from one side of its head to the other:

1. Hatching egg.
2. Two days old.
3. Two weeks old.
4. Four weeks old.
5. Six weeks (the round fish has become flat).
6. Eight weeks (both eyes are now on the same side of the head).

a point just above the right eye; there it comes to a stop, leaving the plaice with both eyes on the same side of its head.

After this astonishing change the plaice swims on its side, with its two eyes uppermost, and lives on the sea bed, like all flat-fish. On its upper side red spots develop to camouflage the plaice from enemies swimming overhead.

Like a chameleon, the plaice can change its pattern of spots to match its background, though scientists find that this is impossible for blind plaice. If plaice are kept in a tank which is illuminated from the bottom as well as from above the fish develop spots on their underside as well.

The plaice can also give itself extra protection in times of danger: by flapping its tail up and down it can throw up sand, which then drifts down again and covers the fish.

Sole and the halibut, the largest flat-fish, also have a 'wandering eye'.

Another sea food with an amazing life story is the eel, whose breeding habits have come to light only in recent years. Many people used to imagine for some strange reason that eels grew from horsehairs which were carried into ponds by the wind; it was also thought that they were produced by black beetles or that they developed from dewdrops. A famous Danish oceanographer, Dr Johannes Schmidt, published his findings on the life story of the eel in 1922.

Adult eels, of a yellowish or silver colour, can be found in streams, ponds, and lakes throughout Europe. But they are not confined to water. After it has been raining, or if there has been a heavy dew, eels may travel for miles overland. In the autumn they start perhaps the strangest animal journey in the world, and certainly the longest migration undertaken by fish.

Impelled by their instinct, the eels leave their ponds and streams and travel down to the sea, going overland when necessary. Once they have left fresh water behind, they head

towards the Sargasso Sea, 2,000 miles from the British Isles, in the west Atlantic. Fabulous legends were once built up around the Sargasso. The sea was supposed to be almost solid with seaweed, and was known to the old sailors as the 'ships' graveyard'; it was said that once a ship became stuck in the weed of the Sargasso nothing could free her, and that her crew must abandon the wreck or perish among the weed.

The eels swim to the fabled Sargasso at the rate of ten miles a day. When they finally reach the Sargasso, they dive down to a depth of 500 fathoms, lay their eggs and die. The baby eels, about a quarter of an inch long and shaped like a leaf, hatch in the following spring. Three years later these new eels swim back to Europe. They swim up the rivers and live in fresh water until they in turn feel the urge to migrate, and, like their parents, return once more to the Sargasso Sea.

CHAPTER

6

Fishing with the Aid of Radio

NO MATTER how skilful a fisherman may be with his nets, his voyage, needless to say, will be fruitless unless he can locate the fish. In the old days fishermen had to rely entirely on their own judgment in deciding where to fish. They were guided by various superstitious signs and omens regarding fish; they even wove their own spells to ensure good catches. Many of their superstitions dated back to pagan times when it was generally believed that the sea led to the edge of the world, and that any vessel that sailed beyond the horizon would fall into a deep chasm and be lost in some sinister underworld. For centuries no mariner would ever learn to swim, because he was convinced that if his ship were wrecked he must inevitably drown.

As knowledge increased, the pagan superstitions were gradually abandoned. The fishermen then believed that God or their patron saint St Nicholas controlled their destiny. Until quite recently Brighton fishermen, when casting their nets for herring or mackerel, would remove their caps and say together: 'There they goes then. God Almighty send us a blessing, it is to be hoped.' Lowestoft men still sometimes say, 'In the name of the Lord' as the first drift net goes over.

At all the ports and harbours along the south coast of England the fishermen stubbornly refused to put to sea on a Sunday—even if they knew there were dense shoals passing—because they believed that, if they broke the Sabbath, all the fish in the area would disappear for ever. When fishing fleets went out during the week, the fishermen would sing hymns in the belief that this would bring them luck—a belief still cherished by some fishermen to this day.

Cornish fishermen, when casting the first nets of the season, would cut a notch in a cork float and insert a silver coin before sending it over the side—a gift to the 'sea god' in return for the fish expected to be caught. Norfolk fishermen used to imagine that fleas were a portent of a rich herring harvest: if they found themselves bitten from head to foot by fleas they were delighted, for this was a sign that their nets would be full! An omen which filled all fishermen with horror was to hear a woman whistling, for this meant bad weather and ill fortune.

In Devon and Cornwall, when salted pilchards were being pressed into barrels for export, their air bladders would sometimes explode with a 'pop'. This was known as 'crying for more' —a sure sign that more pilchards were on their way to be caught.

But fishermen have never been guided only by superstition. Like the countryman tending his crops or livestock, they are always on the look-out for signs of nature which will tell them if fish are about or if there is a threat of bad weather. One belief quite commonly held is that when snow falls on land, herrings will swim close to the shore, a belief for which there is a sound scientific reason. When snow falls the temperature rises slightly; as we have seen, fish are very sensitive to temperature changes, and therefore it is reasonable to believe that the slight increase in warmth following the snow may attract the fish.

Fishermen are often able to detect shoals by watching the

behaviour of gulls, or by studying the colour of the water for indications of the plankton on which fish live.

Although fishermen, as a race, are still deeply superstitious, and place great faith in the signs of nature, they now have many practical ways of searching for fish. One of their simplest devices is the 'feeling wire'—a long length of copper wire with a six-pound lead weight attached to one end. This is dragged through the water behind the fishing boat, and when it passes through a shoal a number of the fish hit or tap the wire. An old salt holding the wire can tell immediately by the slight vibrations the density of the formation of fish and whether it is worth while shooting the nets.

The modern fisherman also makes great use of electronics. The distant water trawler often carries more electronic equipment than a passenger liner. 'Sparks', the radio operator, is one of the most valued men aboard. He is the link with home, and messages of every kind, from weather reports and danger warnings to football results, come through him. And 'Sparks' is the man who looks after the radar and operates the fish detection equipment, which locates the shoals below by sound radio waves. So important is his role that he receives a financial share of the catch.

Radio is now vital to fishermen for several reasons. It keeps them in touch with shore stations and with the vessel's owners; it enables a skipper to chat with the skippers of other vessels about fishing conditions; and in the event of a fishing boat running into difficulty or some unexpected danger, or of sickness aboard, requests for help can be transmitted. Finally, radio entertains the crew during the long bleak days or weeks at sea. A variety programme or the voice of a 'pop singer' from home can greatly cheer men cramped in a cabin miles from civilization in the icy Arctic, with little to do in their leisure time except read, play cards, and spin yarns.

At various points around the coasts of Britain and of every maritime country in the world, there are radio shore stations for communicating with ships at sea. The ships themselves carry many kinds of radio equipment, its range varying according to the size and class of ship and her type of work.

At one end of the scale, for example, there is the Marconi 'Kestrel', a radio-telephone transmitter-receiver especially designed for small craft. This instrument, which is also a direction-finder, is ideal for drifters or small trawlers which do not operate too far from land, and which need medium-powered communication with shore stations and, by link telephone calls, with the offices of the owners. Fishing vessels of this class have very little space and limited power supplies, and this equipment is both compact and easy for the crew to operate.

At the opposite end of the scale there is massive and extremely powerful equipment for use by the large distant water trawlers. The trawler with perhaps the most up-to-date electronic equipment of any fishing vessel afloat is the *Junella*, a stern trawler, 240 feet long with a refrigerated hold which can take 48,000 stones of fish, a stone being the common measure for the weight of fish. The *Junella* is fitted with long and short range radio enabling the skipper to keep radio-telephonic and radio-telegraphic contact with the owners' office during month-long trips to the west coast of Greenland. She also carries a 'Kestrel' transmitter-receiver for use in home waters.

In addition to radio, many fishing vessels are equipped with radar and an automatic direction-finder. Radar gives warning of other craft in the vicinity, of rocks and other dangerous hazards, and shows up coastlines. It is a most valuable aid to navigation when visibility is poor, as in fog or a blizzard; it is also a useful aid at night. The direction-finder, another boon to fishermen, picks up signals from radio beacons ashore and automatically indicates the true bearing from the vessel. Two such bearings

show her position where they intersect. This equipment is similar to the direction-finders used by airliners to keep them on course.

In addition to the radio aids for navigation, a large number of fishing vessels also carry electronic instruments to assist in the actual fishing operations. One of the most remarkable of these instruments is the 'Fishgraph' echometer. Originally invented to tell sailors the depth of water under their hulls, this device locates fish shoals by beaming radio waves down to the sea bed. When these sound waves hit the bottom, an echo bounces back, and is picked up by a receiver on the hull. The length of time between the transmission of the sound waves and the receipt of the echo denotes the depth; and this is automatically recorded on a moving band of paper by a stylus, as described in Chapter 1. When the stylus makes smudges above the sea-bed marking, the fishermen know that they are over a shoal which is sending back a second echo. On some apparatus a gong sounds when fish are detected.

Many modern trawlers have an internal communication system to allow the skipper to talk to his men in various parts of the ship during fishing operations. This equipment is also used to provide the crew with music while they work, either from radio broadcasts or from a tape recorder.

The latest development, still in its infancy, is closed-circuit television for long-distance trawlers. It is called 'closed-circuit' because the pictures are relayed along a cable instead of being broadcast through the air.

Television, when generally adopted, will serve many useful purposes, perhaps the greatest advantage being that it will enable the skipper of a stern trawler to supervise operations from the wheelhouse when the nets are hauled in. Without television the skipper of a stern trawler is unable to see what is happening from the bridge. Television cameras would cover the

fish deck and the area astern of the vessel, and relay the pictures on to screens in the wheelhouse. This system, already in operation in a few trawlers, enables the skipper to watch and direct the shooting and hauling-in operations without leaving his post; he can give any necessary orders to the crew by means of the 'intercom.'

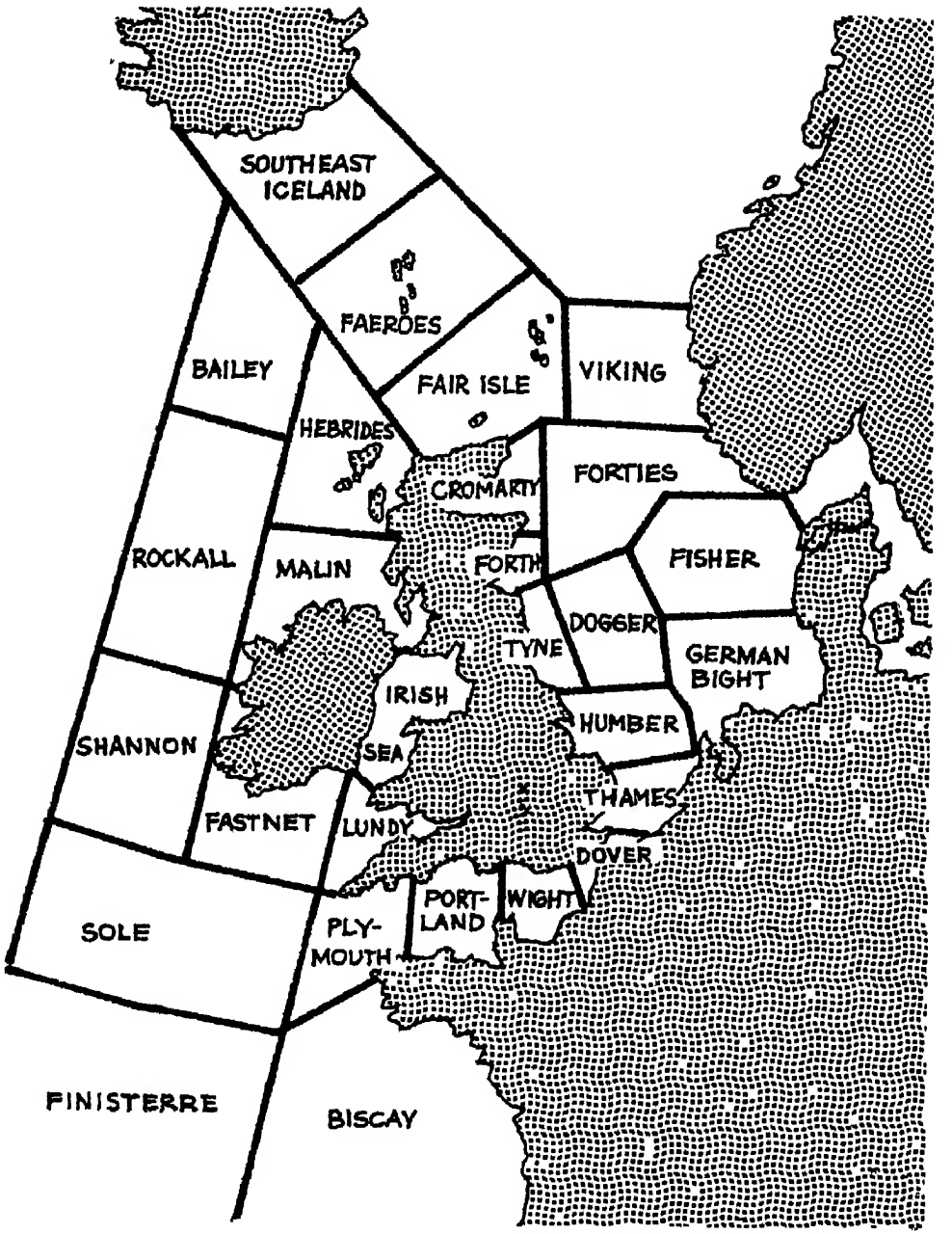
So much electronic equipment is carried by the modern distant water trawlers that, to prevent the wheelhouse becoming cluttered with apparatus, and to save the skipper from walking from one piece to another, the 'fisherman's dashboard' has been developed. The array of equipment is mounted together on a console, thereby enabling the skipper to tell at a glance his position, the ship's speed and direction, the depth of water, and whether he is near a fish shoal. The console contains loud-speakers to allow members of the crew to reply to the skipper's 'intercom.' orders, and to relay messages to the bridge from the radio-room.

Although fishermen have their own special radio frequencies used by the shore stations, they also listen in for weather information and warnings to shipping broadcast by the B.B.C. and the radio networks of other countries. At any time of the day a B.B.C. announcer may interrupt a programme on one of the home services to give the warning: 'Attention all shipping in sea areas Faeroes, Fair Isle, Cromarty, and Viking. The Meteorological Office issued the following gale warning at 18.00 hours G.M.T. Force 8 winds . . .'

This may mean little or nothing to listeners at home, but to the fishermen at sea to the north of Scotland the message is a warning of a rough night ahead.

The sea around the British Isles is mapped out into areas, each of which has a code name; and the wind forces are graded by numbers according to the Beaufort Scale. Force 8, for example, indicates a gale.

SEA AREAS AROUND THE BRITISH ISLES

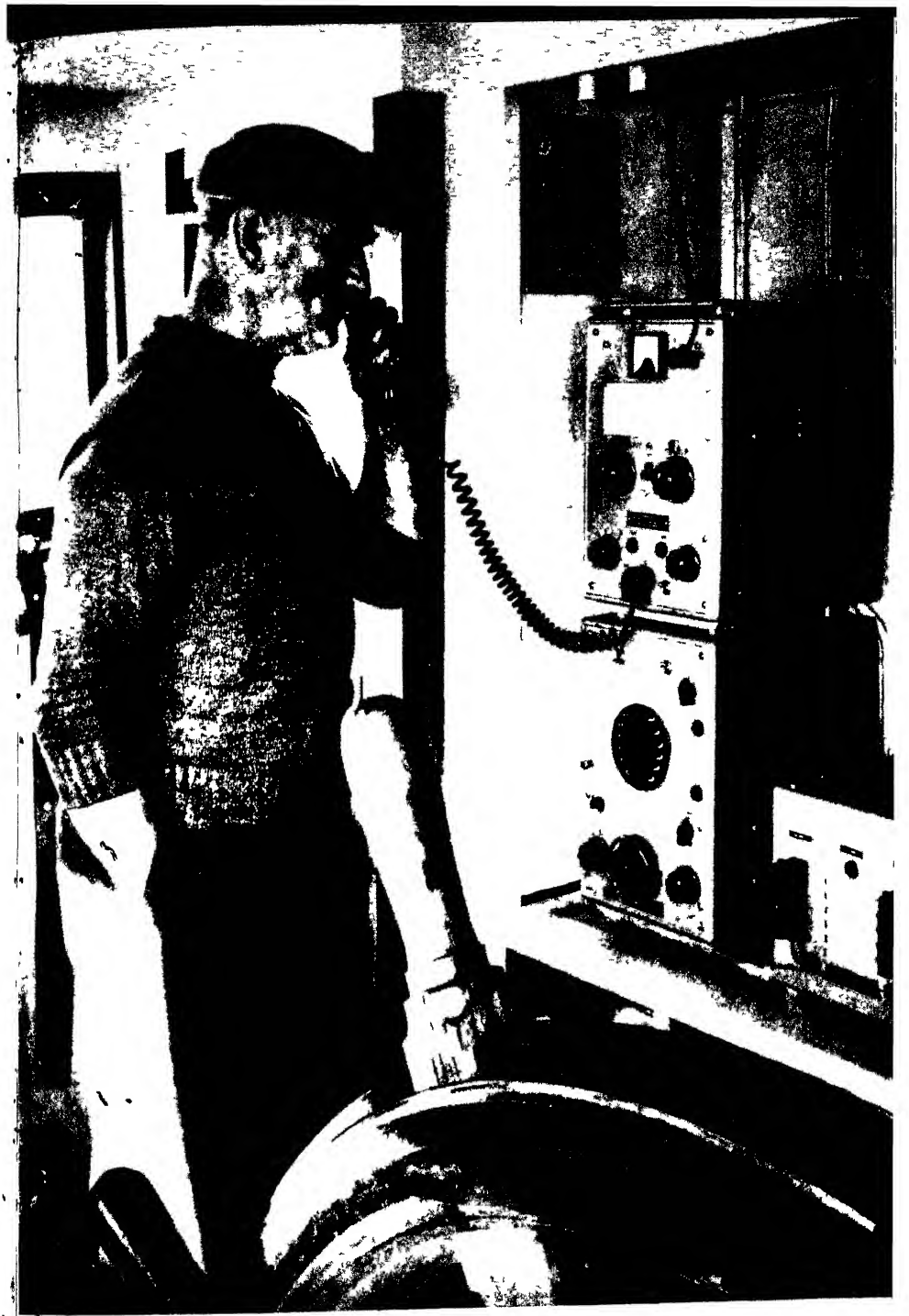


The Beaufort table below shows the sort of weather fishermen may expect when they hear these brief announcements which are of such value to them.

The Beaufort Scale of Wind Force

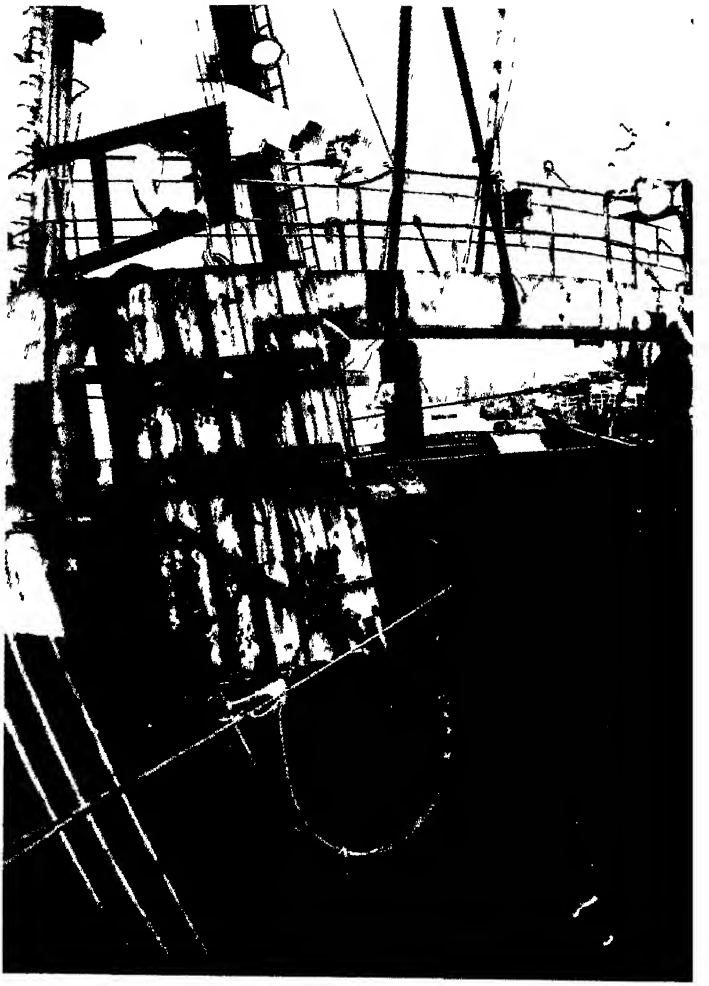
Beaufort Number	*Wind*	*Effect at Sea*	*Effect on Land*	*Knots*	*m.p.h.*
0	Calm	Sea like a mirror	Smoke rises vertically	Less than 1	Less than 1
1	Light air	Ripples with the appearance of scales are formed, but without foam crests	Direction of wind shown by smoke drift but not by wind vanes	1–3	1–3
2	Light breeze	Small wavelets, still short but more pronounced	Wind felt on face: leaves rustle; wind vanes moved by wind	4–6	4–7
3	Gentle breeze	Large wavelets; crests begin to break; foam of glassy appearance	Leaves and small twigs in constant motion; wind extends light flag	7–10	8–12
4	Moderate breeze	Small waves, becoming longer; fairly frequent white horses	Raises dust and loose paper and moves small branches	11–16	13–18
5	Fresh breeze	Moderate waves, taking a more pronounced long form; many white horses are formed	Small trees in leaf begin to sway	17–21	19–24
6	Strong breeze	Large waves begin to form; the white foam crests are more extensive everywhere	Large branches in motion; whistling heard in telegraph wires	22–27	25–31
7	Near gale	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind	Whole trees in motion; inconvenience felt when walking against wind	28–33	32–38

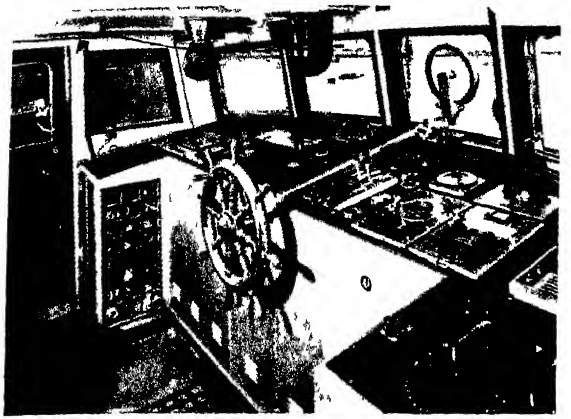
Beaufort Number	*Wind*	*Effect at Sea*	*Effect on Land*	*Knots*	*m.p.h.*
8	Gale	Moderately high waves of greater length; edges of crests begin to break into the spindrift	Breaks twigs off trees; progress impeded	34–40	39–46
9	Strong gale	High waves; dense streaks of foam along the direction of the wind	Slight structural damage occurs; chimney pots and slates are blown off	41–47	47–54
10	Storm	Very high waves with long overhanging crests: the resulting foam, in great patches, is blown in dense white streaks along the direction of the wind; visibility affected	Trees uprooted; considerable structural damage occurs	48–55	55–63
11	Violent storm	Exceptionally high waves (small and medium-sized ships might be for a time lost to view behind the waves); the sea is completely covered with long white patches of foam lying along the direction of the wind; visibility affected	Rarely experienced in Britain, accompanied by widespread damage	56–63	64–72
12	Hurricane	The air is filled with foam and spray; sea completely white with driving spray: visibility very seriously affected	Only encountered in tropics	64–71	73–82



The skipper of a small drifter using the Marconi 'Kestrel' radio-telephone especially designed for small boats

Closed-circuit television enables the skipper to supervise the hauling-in of the nets without leaving the wheelhouse Right *A view of the stern of the 'Junella', one of the best electronically equipped fishing vessels afloat, showing a television camera mounted on the guard rail of the gallows bridge* Below *The picture received in the wheelhouse of one of the crew at work in the fishroom*



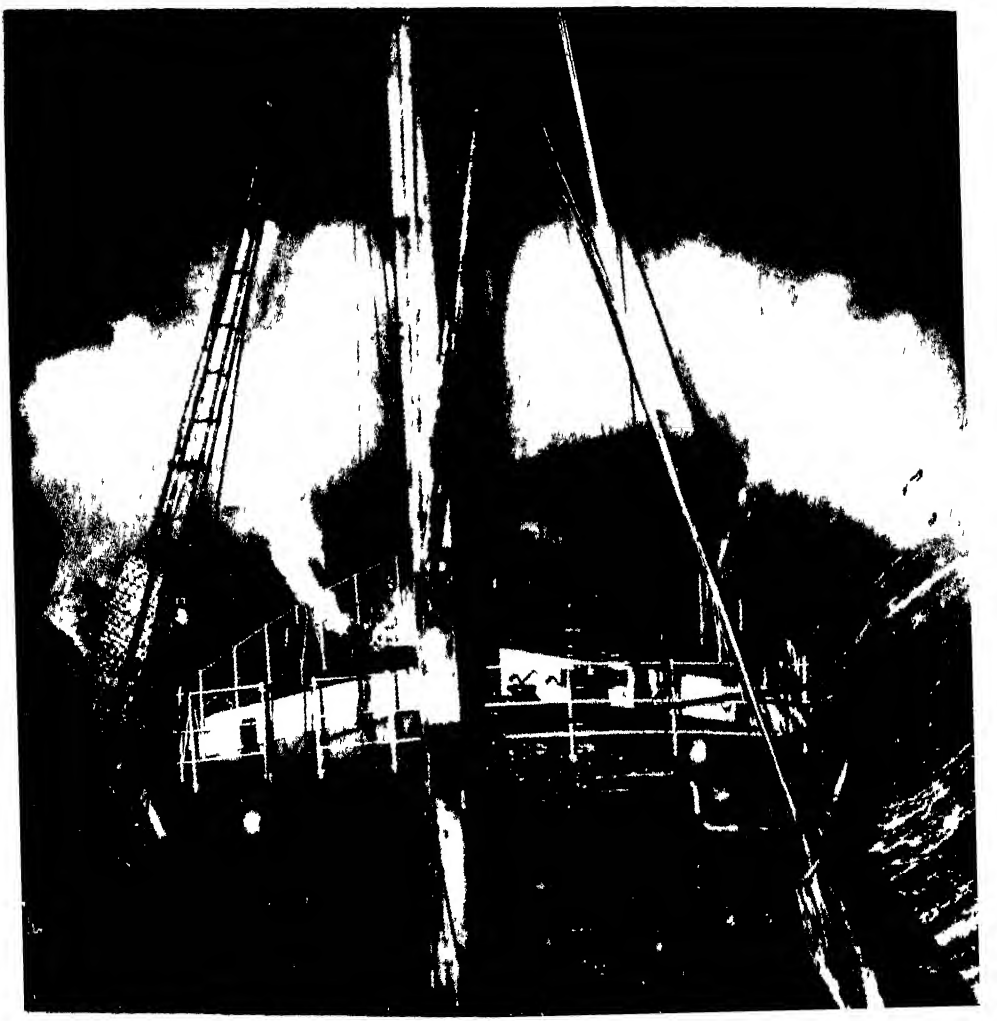


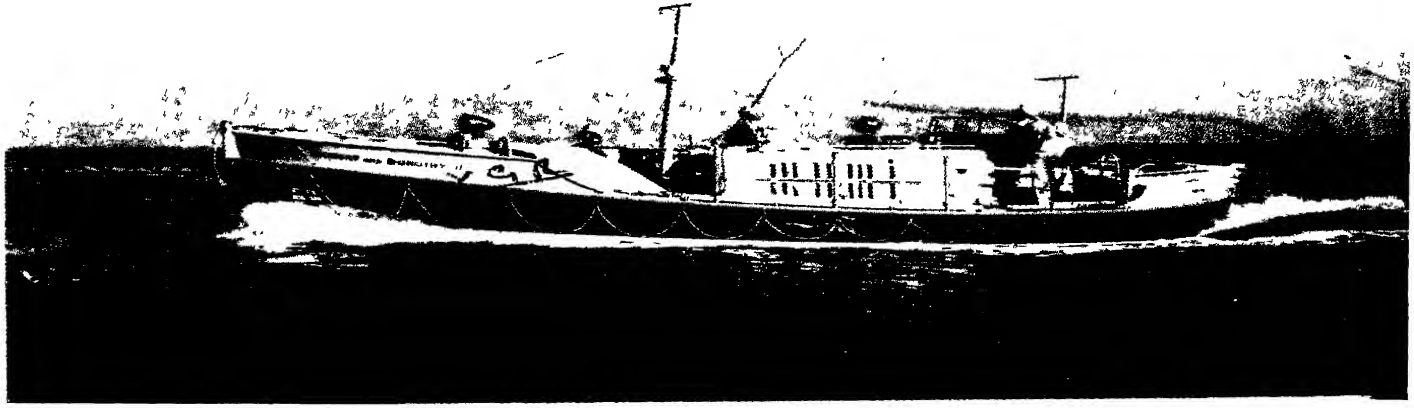
The master control panel in the wheelhouse, from which talk-back and entertainment systems, depth-indicator, radio-telephone, direction-finder, echometer, etc , are operated

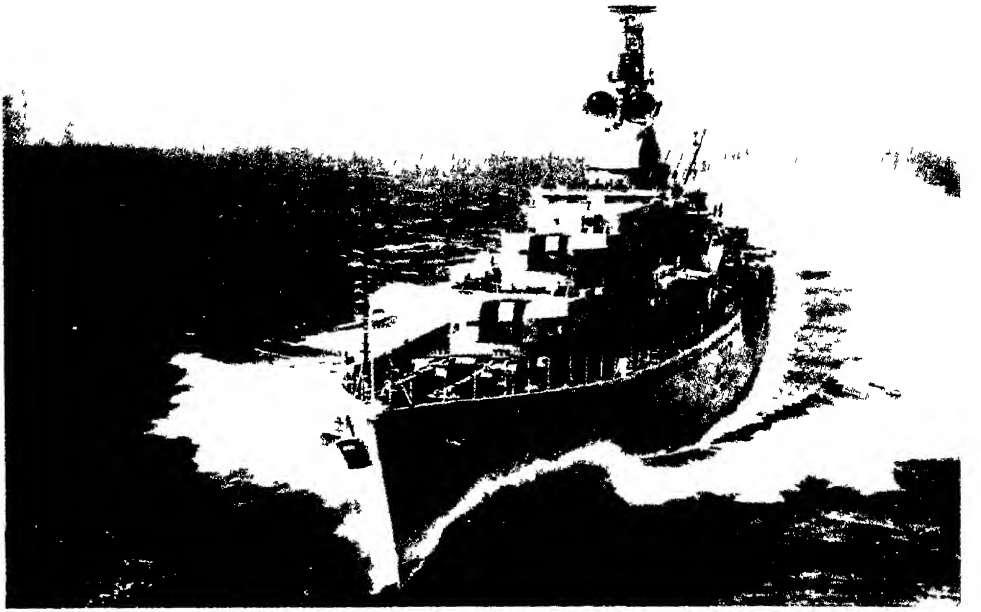
Left· *Watching the 'Fishgraph' echometer, which shows when the vessel is over a shoal* Below. *Smudges on the graph show a concentration of fish*

The Lifeboat Service came into existence nearly two hundred years ago because of concern at the great loss of life among fishermen. Right, above *One of the earliest lifeboats being rowed out to a ship in distress* Right, below· *The latest type of lifeboat, the Oakley, which is self-righting in the worst storm and carries the most up-to-date radio, rescue, and safety devices*

'Force 11 wind in sea area . . .' a distant water trawler pounds into a 70-m.p h. gale on her way to the Arctic fishing grounds







Above: *One of the Fishery Protection vessels which guard the coasts of Britain against 'invasion' by foreign fishermen*

Below *The scene at Hull fish market with the catches unloaded into 'kits' and auctioning about to begin.*

Right: *A porter at Billingsgate, London, one of the world's most famous fish markets, wearing the traditional wood-crowned and tar-painted leather hat on which he balances the fish boxes.*

Early morning at Billingsgate.

CHAPTER

7

For Those in Peril

ALTHOUGH the fisherman of today has the latest aids science can give him, fishing can still be both hazardous and dangerous. Engines may break down at a critical moment; sudden storms may dash the boats against rocky coasts; dense fog may blanket the fleet in an area so treacherous that it is unwise to proceed even with the aid of radar. Fishing vessels are constantly running into trouble of one kind or another, and going to their assistance forms the largest part of a lifeboat crew's work. In a single year lifeboats have been called out to fishing boats in distress no less than 177 times.

Around the coasts of the British Isles there are 150 lifeboats of the Royal National Lifeboat Institution ever ready to come to the aid of fishing fleets. This Institution has been in existence since 1824, and during that period its members have rescued close on 85,000 men in peril at sea. That is an average of eleven lives saved every week.

The story of the lifeboat, one of the most exciting in the history of the sea, began towards the end of the eighteenth century, when many people became horrified at the appalling and unnecessary loss of life around the coasts of the British Isles.

These disasters at sea greatly distressed Dr John Sharp, curate in the village of Bamburgh, who had often seen helpless ships battered to matchwood by violent seas off the treacherous Northumbrian coast. So many poor women in his parish lost their husbands, and so many children their fathers, that Dr Sharp determined to find some way of starting a service of unsinkable boats to go to the rescue of those brave fishermen whose ships were wrecked. Dr Sharp heard of an Essex coach-builder, Lionel Lukin, who had the same ideas. So in 1786 the curate sent the coach-builder a type of fishing boat known as a 'coble' to convert into a craft for saving life at sea. Lukin added watertight compartments and lined the vessel with cork to prevent it from sinking in the heaviest seas. This was the first lifeboat.

Some years later, in 1822, the Isle of Man, where a lifeboat service had by then also been opened, was lashed by exceptionally bad storms. A lot of ships were wrecked; but the Manx lifeboat went to their rescue, and her crew, led by a retired soldier, Sir William Hilary, managed to save many lives. Hilary's adventures with the Manx lifeboat fired him with an urgent determination to provide a chain of lifeboat stations all round the coasts of Britain, instead of in just a few widely separated parts. He appealed to the general public for financial support, and as a result The Royal National Lifeboat Institution for the Preservation of Life from Shipwreck was founded in 1824.

The lifeboat men of the last century had to row their boats into howling storms, depending only on their own muscle power to keep them off jagged rocks. Today lifeboats are propelled by powerful engines, and carry scientific modern equipment for rescue work, including searchlights, rocket guns for firing life-saving lines, and radio. But the lifeboats are still built of wood, as in the past. The hull has a double skin, and the woods used

in its construction come from all over the world. They include English oak for both stem and stern, Canadian elm for the keel and frames, Burmese teak for the planking, and mahogany for the decking. The air cases, which make the craft unsinkable, are made from red cedar.

The boats are still built by hand. They are constructed at boat-building yards on the Isle of Wight; and it takes the skilled craftsmen at these yards about two years to build one boat.

Today there are five types of lifeboat in use. They are:

The Barnett, a 52-foot craft with accommodation for a crew of eight and a hundred survivors. She will cruise 180 miles without refuelling; her displacement weight is 29 tons, and she costs £45,000 to build.

The Watson, of 47 feet with room for a crew of eight and 95 survivors; a cruising range of 143 miles; displacement weight of 23 tons, and costing £40,000.

The Watson, smaller version, of 42 feet with room for a crew of eight and 75 survivors, a cruising range of 113 miles; displacement weight of 16½ tons, and costing £36,000.

The Beach, of 42 feet, for a crew of ten and 75 survivors, with a cruising range of 111 miles, and displacement weight of 16 tons. Cost: £36,000.

The Oakley, of 37 feet, for a crew of seven and 35 survivors, with a cruising range of 72 miles, and displacement weight of 11½ tons. This costs £33,000.

The *Oakley*, the latest type, was designed as recently as 1958, and she incorporates an ingenious self-righting system which makes her absolutely seaworthy in the worst storm. If she should capsize she will turn the right way up again in only six seconds, and her cockpit will be drained of water in twelve seconds. This self-righting system is worked by water ballast.

When the boat capsizes a ton and a half of water automatically pours through pipes into the 'righting tank' on the port side, and this sudden increase of weight causes the boat to roll back into an upright position.

The *Oakley*, although small, carries the latest radio equipment, including medium and high-frequency radio-telephony for communicating both with the shore and with helicopters; and she is also equipped with various safety and rescue devices, one of the most useful being an oil spray. This is used to pour oil on to the sea and calm the waters while survivors are being transferred from a wreck to the lifeboat.

After a lifeboat has been built she is put through gruelling tests before being delivered to the lifeboat station. Here she is given a further test by the crew before she is accepted; if the crew are not satisfied with her performance they have every right to reject her.

The first mechanically propelled lifeboats were driven by steam engines, and the first of these was launched at Harwich in 1890. Although the steam engine was a great improvement on rowing, the steam boats had several drawbacks, the worst being that their fires could be put out by sea water, and steam then had to be raised again before they could proceed to a rescue.

At the beginning of this century petrol-driven boats came into use, but these were of such low power that the engines had to be used in conjunction with sails. It was not until the 1930's that sails were dispensed with.

Now lifeboats are driven by diesel motors, which use less fuel than petrol engines, and therefore give a greater cruising range. Lifeboats are not very fast craft, their top speed being only about eight knots. If they were to cruise faster, and break through the waves, there would be a constant danger of their crew being swept overboard.

In the old days of the rowing and sailing boats one of the

greatest problems was to launch the craft. Sometimes the boats would be towed into the water by horses, but more often they would be dragged into the sea by men, women, and even children. Almost the whole fishing village would turn out to lend a hand in the launching.

Today several methods are employed; these are dictated by the nature of the coast where the vessel is stationed. In some parts the lifeboats are still dragged into the sea on carriages, but instead of using horses they are now hauled by tractors with watertight engines. In other parts the boats are released from the boathouse down special slipways: they hit the water at a speed of about thirty miles an hour, the impact sending up a dramatic cloud of spray. Then about a third of the lifeboats are kept permanently moored in harbours. This system has one drawback: in bad weather it is often difficult for the crew to reach the lifeboat, and they have to be ferried out to the mooring in specially designed craft.

The bulk of the lifeboat crews, but by no means all, are fishermen; they include men from many walks of life, ranging from school teachers to miners.

Normally there are eight men in a lifeboat crew. The leader is the coxswain, and under him there will be a second coxswain, bowman, motor mechanic, assistant motor mechanic, and perhaps three deckhands. The deckhands are usually qualified in first aid, signalling, and radio work. Nearly all the men give part-time service, and are paid a small sum each time the boat is launched. The only full-time member of the crew is the motor mechanic, who has the heavy responsibility of keeping the engines in perfect working order. A lifeboat, like a fire engine, must be ready to answer any call at a moment's notice.

A lifeboat crew is summoned by the firing of two maroons—rockets that explode with a large report, throwing out bursts of green stars. The firing of the maroons causes feverish activity in

the port. The crew dash from their different jobs and hastily put on their yellow oilskins, sea boots and a kapok lifebelt to which is fitted a light that automatically functions if the wearer falls into the sea. Then the crew rushes through the streets to the lifeboat station and mans the boat.

Here is a story of the rescue of fishermen from a wrecked trawler. At half past two on the morning of 4th February 1959 the secretary of the lifeboat station at Longhope, Orkney, received a warning call from the Broughness coastguard station, informing him that a trawler of ninety-three tons, the *Strathcoe*, homeward bound from the Aberdeen fisheries, had gone aground in the Pentland Firth. Thirty-five minutes later he received a second call giving the trawler's exact position. Immediately the secretary ordered the maroons to be fired. The rockets streaked into the cold night sky and exploded with loud reports. From their warm beds the crew came running; and the lifeboat, the *Thomas McGunn*, put to sea just twenty-two minutes after receipt of the second message.

Meanwhile the Stromness lifeboat, the *Archibald & Alexander M. Paterson*, was also alerted; and she put to sea a few minutes after the *Thomas McGunn*.

The trawler was wrecked eight miles from Longhope and eleven miles from Stromness. A flood tide was setting to the south-east, and high water at the position of the wreck would be at eight minutes past six. The *Thomas McGunn* skirted the walls of grey cliffs against which a heavy ground sea was breaking ominously. The spray from this, coupled with patches of fog, made visibility very poor.

The *Thomas McGunn* continued the journey close to the cliffs until her crew suddenly saw a searchlight flashing. This signal was coming from a seine netter whose skipper was trying to draw the lifeboat's attention to an object resembling a wreck close to the cliffs. Since visibility was poor the coxswain gave

the order, 'Send up a flare'. The flare pistol cracked, and seconds later a parachute flare threw down its dazzling light on the bleak scene. It showed that, after all, there was no wreck at that spot, so the lifeboat continued on her course.

On reaching the reported position of the *Strathcoe*, the coxswain ordered a second flare to be fired. As this flare drifted down the lifeboat crew sighted the trawler in a small cleft in the 500-foot cliffs which rose sheer about them. The trawler was hard on the rock bottom of the cleft, with a forty-five degree list to starboard. Waves were breaking over her funnel; her radio, lights, and signals had been put out of action; and her trawl gear was lying in a tangled mass over her starboard side.

At ten minutes to five the Stromness lifeboat reached the scene. She stood by to seaward and acted as a radio-telephone link for the *Thomas McGunn*. In the darkness this lifeboat moved cautiously towards the port quarter of the wreck, but the surge of the ground sea in the shallow water made safe manœuvring impossible. To add to the dangers the bottom was littered with boulders, so the *Thomas McGunn* backed away from the cleft, and veered round to the starboard quarter of the trawler. Here she dropped anchor, and with great difficulty held her position while a breeches-buoy rescue was attempted.

Three times a line was fired from the *Thomas McGunn* to the shivering trawlermen clinging to the wreck. The trawlermen managed to catch the third line; they hauled it and secured the tail block in the wheelhouse. The trawler and lifeboat were now linked by the ropes by which men are pulled to safety in a special canvas seat. As it was imperative to keep the lifeboat's head to sea during this operation, a mooring rope was next rigged from the lifeboat to the starboard quarter of the trawler.

Finally, at first light, the actual rescue operations began. A fisherman sat in the buoy and was slowly drawn over the water towards the *Thomas McGunn*; but in his anxiety he grabbed at

the mooring line, and was swept out of his seat into the sea. The lifeboat men caught their breath, fearing that he would be drowned. But the fisherman spluttered to the surface, still clinging to the breeches-buoy rope, and managed to haul himself along the line to the 'scrambling net' rigged over the side of the *Thomas McGunn*. Here willing hands hauled him to safety and he was taken into the cabin for a warm drink, rub down, and dry clothes.

The coxswain decided that it was too dangerous to continue the rescue from this position because the tide was now full. The lifeboat stood by and waited for the ebb, and at a quarter to eight the rescue operation was resumed in smoother water. The remaining thirteen members of the *Strathcoe*'s crew were brought to safety by means of the breeches-buoy in only twenty-four minutes. The lifeboat weighed anchor and returned to port, leaving the wrecked trawler to the mercy of the waves.

In the cabin of the *Thomas McGunn* the survivors drank hot cocoa and joyfully congratulated each other on their lucky escape. The coxswain of the lifeboat later received a silver medal from the Royal National Lifeboat Institution for his 'courage, skill, and determination'—an honour richly deserved.

CHAPTER

8

Shots Across the Bows

ABOUT £120,000,000 worth of fish and fish products are consumed in Britain every year, and half of this quantity is produced by British fleets. Today fishing is 'big business', and, like all large businesses, it has many problems, ranging from low prices at home, which make fishing uneconomical, to disputes with foreign countries over fishing rights. Various organizations and committees protect and control the industry in Britain.

The principal authority is the Ministry of Agriculture, Fisheries and Food, who keep a watch on all aspects of sea fishing through district inspectors and fishery officers stationed at the main ports. The Ministry is responsible for laws relating to fishing, for reporting to Parliament on the state of the industry, and for running the research stations for the benefit of fishermen.

The Herring Industry Board, set up in 1935, controls the catching and marketing of herrings. Besides operating schemes for promoting sales of fresh and cured herrings and fixing minimum prices, this body is empowered to make loans and grants to fishing companies for the building of new vessels. Another important body is the White Fish Authority. Set up in 1951 by Act of Parliament to reorganize, develop, and regulate the White Fish Industry, it makes grants and loans for building new vessels for inshore, near- and middle-water fleets, and for promoting co-operative marketing arrangements.

Then there are also local Sea Fisheries Committees in England and Wales which control fishing within territorial waters. They enforce by-laws prohibiting fishing in certain areas at certain times, regulate the mesh of fishing nets, and take any other measures that may be necessary to ensure that fish populations are not over-fished, or that young fish are not taken out before they are of suitable size.

The fishermen and others engaged in the industry have their individual interests protected by trade unions and similar organizations. Owners of trawlers mostly belong to the British Trawlers' Federation; trawler officers are members of the Federation of British Trawler Officers, and the crews are represented by the Transport and General Workers' Union and the National Union of General and Municipal Workers. For English drifter owners there is the English Herring Catchers' Association.

While the Ministry controls the general administration of the industry, the Fishery Protection Service, provided by the Admiralty, guards the fishing grounds around the coasts of Britain against 'invasion' by fishermen of other countries. The Service has a fleet of vessels—known as the 5th Fishery Protection and Minesweeping Squadron—and the patrol has the power to 'arrest' any foreign ship fishing within British fishing limits. In Scotland this service is provided by the Department of Agriculture and Fisheries.

There was an understanding among nations that the sea should be regarded as their territorial waters to a distance of three miles from their coast; this limit was set in the days when three miles was just beyond the range of the most powerful cannon. Fishing boats that violate the territorial fishing waters (which now often exceed the original three miles) of another country may be seized by fishery protection ships, their fishing nets and gear confiscated, and their skippers fined. Although this may

mean a severe financial loss to the owners, territorial waters often are violated. If a fishing boat is following a rich shoal the temptation to continue the chase to within the limit is very great! Sometimes a vessel may be just outside the limit and her crew so busy with the nets that they do not realize that they have drifted into the forbidden zone—until a fishery protection vessel comes alongside and challenges them.

Sometimes very serious 'incidents' arise when this happens. In May 1961 an Aberdeen trawler, the 274-ton *Red Crusader*, was arrested by a Danish frigate for illegally fishing in Faeroese waters. An officer and six ratings were placed aboard the *Red Crusader* to make sure the trawler sailed to Thorshavn, the Faroese capital, where the skipper would face proceedings.

During the night the British vessel changed her course and made a dash for freedom. The Danish frigate opened fire, sending warning shots whistling across the trawler's bows. One shot holed her bow; two more damaged the masts and radio antennae. Pom-pom shells crashed into the hull and machine-gun bullets rang against the superstructure. Surprisingly no one was killed.

Soon a British fishery protection vessel and an anti-submarine frigate arrived on the scene and escorted the trawler to safety.

An inquiry commission was set up by the British and Danish governments which finally decided that both parties were in the wrong, and the case was closed. The owners of the *Red Crusader* dropped their claims for compensation and the Danes agreed to take no action over the 'kidnapping' of the Danish prize crew when the trawler escaped.

Several countries, especially those whose economies depend largely on fishing, have been anxious to extend their territorial waters well beyond the three miles; it is unfair, they say, that foreign ships should sail close to their coasts and take the bulk

of the fish. Norway was one country to make this complaint; and, by agreement with Britain and other nations, she has extended her territorial waters to six miles and proposes further to extend the limit to twelve miles in 1970.

A few years ago Iceland extended her fishing limits to cover twelve miles from her coast without negotiating any agreement —and this resulted in a fishing 'war' between British trawlers and Icelandic patrol boats. The Icelandic patrols arrested several British fishing boats within the new limit and escorted them into Reykjavik. There in each case the gear was then confiscated; fines in the neighbourhood of £2,000 were imposed, and the crews were sometimes jailed. Naturally this led to bad feeling, and the trawlers often tried to escape.

The dispute was settled in 1961 when the British Government, 'in view of the exceptional dependence of the Icelandic nation upon coastal fisheries for their livelihood and economic development', agreed to recognize the new zone. These new territorial limits have meant a severe financial loss for trawler companies who had so long regarded the rich shelf round Iceland as a traditional fishing ground; and from time to time the skipper of a trawler takes a chance and violates the territory.

In February and March of 1964 a new convention was drawn up which gave Britain an exclusive fishing limit of six miles instead of three, and a further six miles in which she can regulate fishermen of all countries. This means that only fishermen who have fished in this area previously will be allowed to continue doing so. A twelve-mile limit now applies to the other countries who signed the agreement; they are the six Common Market countries, and Ireland, Denmark, Sweden, Portugal, Spain, Italy and Austria.

Rivalry does not exist only between the different countries. There is also keen competition between vessels from the same

port to catch the most fish and get it back first to sell at the highest price. Skippers who enjoy pints of beer together at the fishermen's pubs ashore often become keen rivals once they put to sea. But this is only healthy competition.

If a fishing vessel runs into danger all rivalry is forgotten—and indeed this applies equally to the feuds between fishermen of different countries. In times of danger fishermen of all nations, like seamen generally, help their comrades.

Language is no barrier, since there is an international code of signals for use by fishing craft and fishery protection vessels. The following table shows the signals and their meanings used by British fishing fleets and fishery protection vessels in the North Sea and the waters round the British Isles.

The signal	*Meaning when used by a British fishing boat*	*Meaning when used by a fishery protection vessel*
Two *red* ensigns, one over the other	I wish to communicate with you	I wish to communicate with you
A *red* ensign over a *yellow* flag	I wish to report a dispute with other fishermen	I request the skipper to come on board; I wish to speak to him
A *red* ensign over a *blue* flag	I am in want of provisions	Write your communication on a board; I cannot understand you
A *yellow* flag over a *red* ensign	I want men to help me	I will send a boat to help you
A *yellow* flag over a *blue* flag	I require medical assistance for a case of internal complaint	I cannot send you a boat. I cannot help you
A *blue* flag over a *red* ensign	I require medical assistance for a case of external injury	Bring the patient here in your boat; the ship's doctor can then examine him
A *blue* flag over a *yellow* flag	Please send me a boat; mine cannot be used; *or* I have no boat	Keep away; I cannot manœuvre
A *blue* flag	I understand your signal	I understand your signal

(Foreign fishing boats display their national flags instead of the red ensign)

The skipper of a fishing trawler or drifter must not only be an expert in modern fishing techniques, fully versed in the various types of electronic apparatus, but he must also have a first-class knowledge of navigation and international law. One of the most valued items in the wheelhouse of a fishing boat is *Olsen's Fisherman's Nautical Almanack.* This volume of some 676 pages—the skipper's 'Bible'—tells him at a glance everything he needs to know from daily tide tables to the right frequencies for his radio transmitter; from fishing rights to the action to be taken if a torpedo from the Second World War should become caught in a net.

Among the hundreds of items of information there is a detailed record of all British fishing boats of over fifteen tons, with the names of the ports to which they belong.

Like cars and aeroplanes, every fishing boat must be registered and bear the code letters of her port on her bows. The following table lists the British fishing ports and their respective code letters:

England and Wales

AB	Aberystwyth	CK	Colchester
BE	Barnstaple	CS	Cowes
BW	Barrow	DH	Dartmouth
BS	Beaumaris	DL	Deal
BK	Berwick-on-Tweed	DR	Dover
BD	Bideford	E	Exeter
BH	Blyth	FH	Falmouth
BN	Boston	F	Faversham
BR	Bridgewater	FD	Fleetwood
BL	Bristol	FE	Folkestone
BM	Brixham	FY	Fowey
CO	Caernarvon	GR	Gloucester
CF	Cardiff	GE	Goole
CA	Cardigan	GY	Grimsby
CL	Carlisle	HE	Hale
CH	Chester	HL	Hartlepool

England and Wales (cont.)

HH	Harwich
H	Hull
IH	Ipswich
LN	King's Lynn
LR	Lancaster
LI	Littlehampton
LL	Liverpool
LA	Llanelly
LO	London
LT	Lowestoft
LE	Lyme
MN	Maldon
MR	Manchester
MT	Maryport
MH	Middlesbrough
M	Milford
NE	Newcastle
NN	Newhaven
N	Newport
PW	Padstow
PZ	Penzance
PH	Plymouth
PE	Poole
PT	Port Talbot
P	Portsmouth
PN	Preston
R	Ramsgate
RR	Rochester
RN	Runcorn
RX	Rye
SS	St Ives
SE	Salcombe
SH	Scarborough
SC	Scilly
SN	Shields, North
SSS	Shields, South
SM	Shoreham
SU	Southampton
ST	Stockton
SD	Sunderland
SA	Swansea
TH	Teignmouth
TO	Truro
WH	Weymouth
WY	Whitby
WA	Whitehaven
WI	Wisbech
WO	Workington
YH	Yarmouth

Scotland

A	Aberdeen
AA	Alloa
AH	Arbroath
AD	Ardrossan
AR	Ayr
BA	Ballantrae
BF	Banff
BO	Borrowstowness
BRD	Broadford
BCK	Buckie
BU	Burntisland
CN	Campbeltown
CY	Castlebay
DS	Dumfries
DE	Dundee
FR	Fraserburgh
GW	Glasgow
GH	Grangemouth
GN	Granton
GK	Greenock
INS	Inverness
IE	Irvine
KY	Kirkcaldy
K	Kirkwall
LH	Leith
LK	Lerwick

Scotland (cont.)

ML	Methil
ME	Montrose
OB	Oban
PEH	Perth
PD	Peterhead
PWG	Port Glasgow
RO	Rothesay
SMH	St Margaret's Hope
SY	Stornoway
SR	Stranraer
TT	Tarbert
TN	Troon
UL	Ullapool
WK	Wick
WN	Wigtown

Ireland

BA	Ballina
B	Belfast
CE	Coleraine
C	Cork
DA	Drogheda
D	Dublin
DK	Dundalk
G	Galway
L	Limerick
LY	Londonderry
NS	New Ross
N	Newry
S	Skibbereen
SO	Sligo
T	Tralee
W	Waterford
WT	Westport
WD	Wexford
Y	Youghal

Isle of Man

CT	Castletown
DO	Douglas
PL	Peel
RY	Ramsey

Channel Islands

GU	Guernsey
J	Jersey

CHAPTER

9

From the Sea to the Shops

WHEN the fishing boats bring their catches into port no time is lost in unloading the fish, for of course it must reach the markets and shops in an absolutely fresh condition. Very often the boats return in the evening; and dockers—known as 'bobbers' in Hull and as 'lumpers' in Grimsby and other ports —work throughout the night unloading and packing the fish into the 'kits'. Next day auctioneers on the wharves move among these aluminium boxes, selling the fish to port wholesalers for the best prices they can obtain.

These merchants then send the fish by special trains to inland wholesalers, who in turn sell it through markets to the fishmongers. And so, perhaps only a few hours after it has been caught, the fish are laid out on slabs in the fish shops, ready to be bought by the housewife.

Although most fresh fish is sold in the big markets of Britain's main cities, some fishmongers prefer to buy their supplies direct on the quayside where they are landed.

Cod and other demersal fish are landed mainly at Grimsby, Hull, Aberdeen, Fleetwood, Lowestoft, and North Shields. Grimsby is world renowned both as a cod and haddock port, while Hull trawlers usually produce the largest catch of demersal fish in general.

Great Yarmouth and Lowestoft are the principal herring ports during the late autumn season; but in the summer months Fraserburgh becomes the busiest herring port. Together with Aberdeen and Peterhead, Fraserburgh contributes a quarter of Britain's total herring catch each year. Many of the herrings caught by the Peterhead drifters are pickled and exported to the Soviet Union.

Before the introduction of refrigerating plant, fishermen often experienced great difficulty, especially in hot sultry weather, in delivering their fish to market in a fresh condition. Today they can quick-freeze their fish as soon as it is brought aboard their trawlers. But freezing or packing the fish in ice does not completely solve their problem. The intense cold prevents the development of most forms of bacteria which cause fish to go bad and decay; but there are certain kinds of bacteria which are not affected by low temperatures, and these make the fish deteriorate in quality and give off an unpleasant 'fishy' odour.

However, after the discovery of penicillin, the wonderful antibiotic that has saved the lives of so many people by destroying bacteria, scientists began to explore the possibilities of using similar antibiotics to preserve fish. Many experiments were made; and finally in 1962 the Ministry of Agriculture, Fisheries and Food gave approval to the preservation of fish for human consumption by means of an antibiotic called Terramycin. This drug is placed in the crushed ice in which the trawlermen pack the fish; and tests have proved that fish stored in ice treated with Terramycin arrive at port in a fresher and purer condition than fish in plain ice. When the fish is cooked, the antibiotic is destroyed by the heat, leaving no unpleasant taste or after-effects.

In the old days, before refrigeration, many types of fish were salted or cured to preserve them, and of course large quantities

of herrings are still cured and turned into kippers or bloaters. This is done by a smoking process before the fish go to market. To make bloaters, the herrings are soaked in brine for six to eight hours, and then hung up and smoked for a further twelve hours. To make kippers, the herrings are split, put in the brine for about twenty minutes, and are then left overnight in the smoke of oak shavings to give them their distinctive flavour. Chemical dyes are now often added to the brine to give the fish the 'smoked' look, and this shortens the period of smoking; but some people do not consider these kippers so tasty as those cured by the traditional method.

Before the herrings are smoked they are first gutted. This operation, which is still best done by hand, is performed by Scottish 'herring girls' who move southwards from port to port, following the fleets during the herring migration. Wielding their sharp knives with amazing skill, they open the fish and remove the offal in a flash. Various attempts have been made to produce machines to do this work, but no machine has yet been able to match the speed and dexterity of the 'herring girls' from Scotland.

Cod and haddock are usually filleted before being sent to the fish markets. The heads and tails are chopped off, the skin is removed, and the bones are taken out. About half the fish is cut away, but this is not wasted since it is processed into fish meal for animals.

To keep fish fresh for an unlimited period, the process of deep-freezing has been developed on a large scale in the last few years. This is done by bringing down the temperature of the fish from 32° F. to 23° F. in less than two hours and then to minus 5° F., after which it can be held in storage at zero. Deep-frozen fish is either sold in blocks for the fishmonger to thaw out, or in packets for the housewife to keep in her refrigerator. Another and older way of storing fish is, of course, to

can them, pilchards and sprats being particularly suitable for canning.

The most famous fish market in Britain, and one of the most famous in the world, is Billingsgate, in the City of London. Proprietors of fish shops within a radius of forty miles of the capital buy their fish at Billingsgate.

Situated by the Thames under the tall column of the Monument commemorating the Great Fire of 1666, the market takes its name from an ancient king of the Britons, Belin, who in A.D. 400 built a gate at this spot. In 976, when 'Blynesgate' was London's only wharf, King Ethelred made a law to tax the boats tying up there. Small boats had to pay a halfpenny toll, larger boats with sails a penny, hulks fourpence, and fishing boats a halfpenny or penny according to size. In May 1699 an Act of Parliament constituted Billingsgate as a free and open market for six days a week with a special provision for the sale of mackerel before church on Sundays.

For many centuries the fish was brought to the market by boat, but when stagecoaches linked London with different ports especially choice fish would be sent to Billingsgate by road. Gentlemen who prided themselves on their table would often wait for these coaches to roll in, and bid in person for nice Dover sole or freshly caught lobster. Later, in the nineteenth century, when the railways began to spread across the country, making it possible to transport fresh fish from more distant fishing ports, the importance of Billingsgate increased enormously.

Today there is an air of romance and excitement at Billingsgate, with the smell of fish and the tang of the sea pervading the various streets leading to the large covered market, with open shops displaying the fish on marble slabs, and cafés where porters in white smocks go to warm themselves up with well-deserved cups of tea after handling the icy fish.

The market opens at six o'clock in the morning, and immediately Billingsgate is bustling with activity. Porters wheel trolleys stacked high with boxes of fish. Some carry the boxes on their heads, skilfully balanced on the top of their strange leather hats. These hats look vaguely like bowlers, and the porters are proud of them. 'They used to be traditional in the market,' a fish salesman's clerk explained. 'They are made out of leather and have a round piece of wood in the crown for the boxes to rest upon. The porters protect their hats by painting them with tar.' The clerk sighed, and added: 'But you can't buy these hats any more. An old chap used to make them for the market until a few years ago, but now he has gone and there is no one left to take his place. A porter's hat is now quite valuable. When a young man becomes a porter here he does everything he can to get hold of one. It's a sort of badge of office, and really high prices are paid for the hats. Fathers hand them on to their sons.'

In the lanes of the spotless market a fascinating array of fish is displayed—huge white conger eels coiled up in tubs of ice; black lobsters, still alive and twitching their long feelers; herrings and hake, haddock and halibut; prodigious quantities of every consumable fish. Here are tubs of cods' roes; there fine red-spotted plaice in beds of crushed ice.

Mind your backs!' shouts a porter, racing along with his trolley, and everyone jumps out of the way.

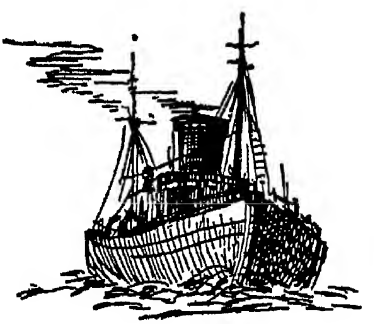
One section of the market seems to be devoted to shellfish. There are wet sacks of oysters and trays of scallop shells opened to show their quality. Piled beside them are boxes of prawns from Japan and Norway, and containers of frozen crayfish from New Zealand. Next door a man, perhaps a chef from a famous restaurant, is carefully examining a smoked salmon before making his purchase.

'Lovely Dover sole!' cries a salesman near by.

'Soused herrings! Soused herrings!' calls another in competition.

Fish, fish everywhere—and vast quantities more behind the scenes. 'We only show *samples* of our fish,' a fish merchant explained. 'Most of the boxes are in trucks which have come from the railways. All the fish comes here by rail these days. We open a box of fish at random to inspect its condition, and, if this is up to standard, we can be sure that the rest of the consignment will be of the same quality. A customer may see the box, and decide to buy a dozen. Our porter then unloads the boxes from the truck and takes them to the customer's van. Most of the fish sold never comes into the covered area.'

At Billingsgate, as on a lesser scale at other fish markets, is gathered the rich harvest of the sea—a harvest brought in by driftermen who have worked through the dawn hauling nets, by seiners who have hunted elusive shoals, and by trawlermen who perhaps have braved Arctic storms.



GLOSSARY

Beaufort Scale. A method of grading the force of the wind.

Bloaters. Herrings soaked in brine for six to eight hours, then smoked.

'*Bobbers*'. A name used for fish port dockers at Hull.

'*Busses*'. The name for early Dutch fishing boats.

Capstan. A machine with a large drum for winding in cable.

Codend. The mesh bag for holding the fish at the rear end of a trawl net.

Contraband. Smuggled goods.

Corsair. A privateer or pirate authorized by the government of his country.

Cran. A measure of 37½ gallons by which herrings are sold.

Deep-freezing. A method by which the temperature of the fish is dropped from 32° F. to 23° F. in less than two hours, then to minus 5° F., after which the fish can be stored at zero.

Demersal fish. Fish living near the sea bottom.

Diatoms. Microscopic green plants: the basis of all life at sea.

Direction-finder. Equipment for picking up signals from shore radio beacons and thus determining the position of the vessel.

Drifters. Fishing boats which allow their nets to drift with the tide. They catch pelagic fish such as herrings.

Dunkirkers'. French pirates, once the terror of English fishermen.

Echometer. An electronic device which indicates, by sending echoes to the sea bed, the depth of water below a ship's hull. It also shows shoals of fish.

Excisemen. Officers who collect customs duty and prevent the evasion of payment.

Fathom. A nautical measure of length, being six feet.

'*Feeling wire*'. A wire pulled behind a fishing boat to detect shoals of fish.

'*Fishgraph*'. An echometer used for locating shoals.

Floats. Buoyant or air-filled containers used to support nets in the water.

Free trader. An old name for a smuggler.

Fry. Newly hatched fish.

Galley. The kitchen of a vessel.

Gallows. An iron frame holding the pulley through which the warp runs.

Gorge. A primitive bait-holder for catching fish. A forerunner of the fish-hook, it was not barbed.

Hydrography. A scientific study of seas, lakes and rivers, and their physical features such as tides and currents.

'*Jaggers*'. Fast Dutch craft (the forerunners of yachts) used to take fish from the slower 'busses' to port.

Kippers. Split herrings, soaked in brine for twenty minutes and then smoked.

'*Knock out*'. The order to release the towing block allowing the two warps to spring apart prior to hauling in.

Larva. Baby fish, or insects, just issued from the egg.

'*Lumpers*'. A name used for fish port dockers at Grimsby.

Maroons. Rockets which explode with a very loud report.

'*Messenger*'. An iron hook which is used to bring the two warps together so that they can be locked in a towing block.

Otterboards. Wooden boards about 10 feet by 5 feet wide which

hold the mouth of a trawl net open as they plane outwards underwater.

Over-fishing. The taking from the sea of too many fish.

Pelagic fish. Fish that live near the surface of the sea.

Plankton. Minute animals and plants floating in the sea providing food for fish.

Port. The left-hand side of a vessel as one looks forward to the bows.

Pounds. Wooden pens erected on the deck of a fishing boat into which fish are dumped until they can be packed in the holds.

Radar. Electronic equipment which uses reflected radio waves to locate the presence of objects (such as other ships) and to determine their position.

R/T. Radio telephone, used by fishing boats to talk with each other and with the shore.

Ring netting. A method of fishing, using a net stretched between two boats.

Seine nets. Nets used to encircle fish shoals.

Shoal. A multitude of fish moving together.

Shooting the nets. This operation is the paying out of the net from the fishing boat.

Sluthers', or 'scalders'. Arctic jellyfish which clog the nets of fishermen. They can sting the skin and therefore are heartily disliked. The Latin name for them is *Cyanes capillata.*

'Sparks'. A nickname for a ship's radio operator.

Spawning areas. Areas where fish deposit their eggs.

Starboard. The right-hand side of a vessel as one looks forward to the bows.

Stern trawlers. Fishing vessels which shoot and haul their nets from the rear instead of over the side.

Superstructure. The part of the boat, including cabins, wheelhouse, etc., built above the level of the deck.

Terramycin. An antibiotic placed in ice to preserve fish.

Trawler. A fishing boat designed to catch fish that live close to the bottom of the sea.

Trim. The adjustment of cargo and ballast in a ship.

Unigan system. A method of fishing from the stern by use of a massive steel arch which can be hydraulically operated to swing out over the water while the net is being hauled in.

Warps. Steel cables to which the nets are attached.

Wheelhouse. A cabin for the steersman. On larger vessels it would be referred to as the bridge.

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